AMI Configuration Commands Reference Manual • Part 2

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FCC CLASS A NOTICE

<u>WARNING</u>: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void this user's authority to operate this equipment.

NOTE: The *TNX-*210, *TNX-*1100, *ASX-*200WG, *ASX-*200BX, *ASX-*1000, *ASX-*1200, *ASX-*4000, *ESX-*3000, *ForeRunnerLE* 25, and *ForeRunnerLE* 155 have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

DOC CLASS A NOTICE

This digital apparatus does not exceed Class A limits for radio noise emission for a digital device as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

CE NOTICE

Marking by the symbol **CE** indicates compliance of this system to the EMC (Electromagnetic Compatibility) directive of the European Community and compliance to the Low Voltage (Safety) Directive. Such marking is indicative that this system meets or exceeds the following technical standards:

- EN 55022 "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."
- EN 50082-1 "Electromagnetic compatibility Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC 1000-4-2 "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements."
- IEC 1000-4-3 "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiate electromagnetic field requirements."
- IEC 1000-4-4 "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements."

VCCI CLASS A NOTICE

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

AUSTRALIA EMC COMPLIANCE

This product has been tested and found to comply with the Class A electromagnetic compatibility limits specified in AS/NZ 3548.

FCC REQUIREMENTS (Notice to Users of DS1 Service)

The following instructions are provided to ensure compliance with the FCC Rules, Part 68.

- This device must only be connected to the DS1 network connected behind an FCC Part 68 registered channel service unit. Direct connection is not allowed.
- (2) Before connecting your unit, you must inform the telephone company of the following information:

Port ID	REN/SOC	FIC	USOC
NM-6/DS1C	6.0N	04DU9-BN,	RJ48C
NM-2/DS1C		04DU9-DN,	
NM-8/DS1D		04DU9-1ZN	
NM-4/DS1D		04DU9-1SN, and	
		04DU9-1KN	

- (3) If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if your equipment or the telephone line is the source of the trouble. If your equipment needs repair, it should not be reconnected until it is repaired.
- (4) If the telephone company finds that this equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give you advance notice if possible.
- (5) Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.
- (6) If the telephone company alters their equipment in a manner that will affect use of this device, they must give you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.

CANADIAN IC CS-03 COMPLIANCE STATEMENT

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

E1 AND E3 NOTICE

The E1 (NM-6/E1C and NM-2/E1C) and E3 (NM-4/E3C and NM-2/E3C) network modules that are described in this manual are approved for use in FORE Systems' host systems providing that the instructions below are strictly observed. Failure to follow these instructions invalidates the approval.

Pan European Approval - CE Marking

Pan European approval of the E1 network module was issued by BABT following assessment against CTR12. This means that it can be connected to ONP and unstructured PTO-provided private circuits with 120 Ω interfaces in all European countries, according to Telecommunications Terminal Equipment (TTE) Directive 91/263/EEC. Thus, the following CE mark applies:

C€168.X

The E1 and E3 network modules conform to safety standard EN60950 1992 following the provisions of Low Voltage Product Safety Directive 73/23/EEC and CE Marking Directive 93/68/EEC, and can be marked accordingly with the CE symbol.

The E1 and E3 network modules conform to EN55022 1994 and EN50082-1 1992 following the provisions of the EMC Directive 89/336/EEC, and can be marked accordingly with the CE symbol.

National Approvals

UK

Network Module	Connects to	Approval Number
EI	Structured and unstructured PTO-provided private circuits with 75 Ω interfaces	AA60953
E3	PTO-provided private circuits with 75 Ω interfaces	NS/4387/1/T/605954

Germany

Network Module	Connects to	Approval Number
E3	Structured PTO-provided private circuits	A127535H for the ASX-1000
	with 75 Ω interfaces	A127534H for the ASX-200BX or ASX-200WG

Switzerland

Network Module	Connects to	Approval Number
E1	Structured PTO-provided private circuits with 120 Ω interfaces	96.0872.J.N
E3	Structured PTO-provided private circuits with 75 Ω interfaces	96.0873.J.N

Required User Guide Statements - UK Installation

The use of auxiliary products not authorized by FORE Systems[®] in FORE Systems ATM Switches may cause the power specification to be exceeded and is a potential safety hazard.

The equipment must be installed such that with the exception of the connections to the host, clearance and creepage distances shown in the table below are maintained between the network module and any other assemblies which use or generate a voltage shown in the table below. The larger distance shown in brackets applies where the local environment within the host is subject to conductive pollution or dry non-conductive pollution which could become conductive due to condensation. Failure to maintain these minimum distances invalidates the approval.

Clearance (mm)	Creepage (mm)	Voltage Used or Generated by Host or by Network Modules
2.0	2.4 (3.8)	Up to 50 V _{rms} or V _{dc}
2.6	3.0 (4.8)	Up to 125 V _{rms} or V _{dc}
4.0	5.0 (8.0)	Up to 250 V _{rms} or V _{dc}
4.6	6.4 (10.0)	Up to 300 V _{rms} or V _{dc}

For a host or other expansion card fitted in the host, using or generating voltages greater	Above 300 V _{rms} or V _{dc}
than 300V (rms or dc), advice from a competent telecommunications engineer must be	
obtained before installation of the relevant equipment.	

NOTE: Installing the network modules in the appropriate FORE Systems hosts, according to the installation instructions provided, satisfies the requirements listed above.

The following tables show the available ports and their safety status:

NM-6/E1C and NM-2/E1C

Ports	Safety Status
E1 Ports	TNV operating at SELV
Bus Connector	SELV

NM-4/E3C and NM-2/E3C

Ports	Safety Status
E3 Ports	TNV operating at SELV
Bus Connector	SELV

SAFETY CERTIFICATIONS

ETL certified to meet Information Technology Equipment safety standards UL 1950, CSA 22.2 No. 950, and EN 60950.

Prefa	ce	
Relate Techn Typog Impor Laser Safety	ed Manua ical Supp raphical stant Infor Warning Precaut Modific	iaries. i ils ii port iii Styles iv mation Indicators .v vi vi cations to Equipment vii vii
CHAF	PTER 1	Introduction
CHAF	PTER 2	Port Configuration Commands
2.1	AAL5 F	Packet Discard Command2 - 2
2.2	Config	uring the State of a Port
2.3	AISRD	I Port Configuration Commands
2.4	CAC P	ort Configuration Command
2.5	CDVT	Port Configuration Command
2.6		ES Port Configuration Commands2 - 7
	2.6.1	Enabling/Disabling CES on a Port
	2.6.2	Configuring DS1 CES Port Framing2 - 7
	2.6.3	Configuring DS1 CES Port Line Length
	2.6.4	Enabling/Disabling Upstream AIS2 - 9
	2.6.5	Displaying DS1 CES Port Line Status
	2.6.6	Configuring DS1 CES Port Loopback
	2.6.7	Configuring the DS1 CES Port Line Coding
	2.6.8	Displaying the DS1 CES Port Configuration
2.7		Port Configuration Commands
	2.7.1	Enabling/Disabling CES on a Port
	2.7.2	Configuring CRC4 Framing on an E1 CES Port2 - 14
	2.7.3	Reserving TS16 for Signalling on an E1 CES Port
	2.7.4	Enabling/Disabling Upstream AIS2 - 15
	2.7.5	Displaying E1 CES Port Line Status2 - 16
	2.7.6	Configuring E1 CES Port Loopback
	2.7.7	Displaying the E1 CES Port Configuration
28	Config	uring Port Delay 2 - 19

2.9	DS1 Po	rt Configu	ıration Commands	2 - 20
	2.9.1	Configu	uring DS1 Port Empty Cells	2 - 20
	2.9.2	Configu	uring DS1 Port Line Length	2 - 21
	2.9.3	Configu	uring DS1 Port Loopback	2 - 22
	2.9.4	Configu	uring DS1 Port Mode 2	2 - 22
	2.9.5	Configu	uring Pseudo-Random Bit Sequence Generation 2	2 - 23
	2.9.6	Configu	uring DS1 Port Scrambling	2 - 23
	2.9.7		ng the DS1 Port Configuration	
	2.9.8	Configu	uring DS1 Port Timing	2 - 25
2.10	DS3 Po	rt Configu	ıration Commands	2 - 26
	2.10.1	Configu	uring DS3 Port Empty Cells	2 - 26
	2.10.2	Configu	uring the DS3 Port Framing	2 - 27
	2.10.3		uring DS3 Port Line Length	
	2.10.4	_	uring the DS3 Port Loopback	
	2.10.5		uring the DS3 Port Mode 2	
	2.10.6		uring the DS3 Port Scrambling	
	2.10.7		ng the DS3 Port Configuration	
	2.10.8	•	uring DS3 Port Timing	
2.11	E1 Port	•	ation Commands	
	2.11.1		uring E1 Port Empty Cells	
	2.11.2		uring E1 Port Line Length	
	2.11.3	Configu	uring E1 Port Loopback	2 - 33
	2.11.4		uring E1 Port Mode	
	2.11.5		uring E1 Port Scrambling	
	2.11.6		ng the E1 Port Configuration	
	2.11.7	•	uring E1 Port Timing2	
2.12		_	ation Commands	
	2.12.1		uring E3 Port Empty Cells	
			Configuring the E3 Port Loopback	
	2.12.2		uring E3 Port Mode	
	2.12.3		uring E3 Port Scrambling	
	2.12.4		ng the E3 Port Configuration	
	2.12.5	-	uring E3 Port Timing	
2.13		_	ommand	
2.14			ote Failure Detection	
2.15			Configuration Commands	
	2.15.1		Plus DS1 Line Interface Configuration Commands 2	2 - 44
		2.15.1.1	Configuring the Status on a	
			FramePlus DS1 Port	2 - 44
		2.15.1.2	Configuring the Framing Mode	
			on a FramePlus DS1 Port	2 - 45

		2.15.1.3	Configuring the Line Length on a
			<i>FramePlus</i> DS1 Port
		2.15.1.4	Displaying Line Status Information
			on a FramePlus DS1 Port
		2.15.1.5	Configuring the Loopback on a
			FramePlus DS1 Port
		2.15.1.6	Configuring the Line Coding on a
			<i>FramePlus</i> DS1 Port
		2.15.1.7	Displaying FramePlus DS1 Information2 - 48
			Configuring Timing on a FramePlus DS1 Port
	2.15.2	Framel	Plus E1 Line Interface Configuration Commands 2 - 49
		2.15.2.1	Configuring the Status on a FramePlus E1 Port 2 - 49
		2.15.2.2	Configuring CRC Checking on a
			<i>FramePlus</i> E1 Port
		2.15.2.3	Reserving TS16 for Signalling on a
			<i>FramePlus</i> E1 Port
		2.15.2.4	Displaying Line Status Information
			on a FramePlus E1 Port2 - 51
			Configuring Loopback on a FramePlus E1 Port 2 - 52
			Displaying FramePlus E1 Information
			Configuring Timing on a FramePlus E1 Port2 - 53
2.16	J2 Port	•	ition Commands
	2.16.1		uring Empty Cells on a J2 Port2 - 54
	2.16.2	Configu	uring J2 Port Line Length2 - 55
	2.16.3		ıring J2 Port Loopback
	2.16.4		g J2 Port Configuration
	2.16.5	Configu	uring J2 Port Timing2 - 57
2.17	LED Po	ort Configu	ıration Commands
	2.17.1	LED M	odel Configuration
	2.17.2	Display	ring the LED Model Configuration
2.18	Port Po	licing Con	figuration Command
2.19	Partial	Packet Pol	licing Command
2.20			Configuration
2.21		-	figuration Commands
	2.21.1		uring SONET Port Empty Cells
	2.21.2		uring SONET Port Loopback
	2.21.3		uring SONET Port Mode
	2.21.4		uring the SONET Port Scrambling2 - 68
	2.21.5		g the SONET Port Configuration
	2.21.6		uring SONET Port Timing
		•	

2.22	TAXI P	ort Configi	uration Commands	72
	2.22.1	Config	uring TAXI Port Loopback	72
	2.22.2		ng the TAXI Port Configuration 2 -	
2.23	TP25 F		guration Commands2 -	
	2.23.1	_	uring the TP25 Port Loopback	
	2.23.2		ng the TP25 Port Configuration	
2.24			guration Commands	
2.24	2.24.1		uring Port Traffic on Series C Network Modules	
	2.24.1	2.24.1.1	Configuring Cell Delay Variation	70
		2.24.1.1	on a Series C Network Module2 -	77
		2 24 1 2	Setting the CLP Threshold on a	' '
		2.27.1.2	Series C Network Module2 -	77
		2.24.1.3		
			Configuring Port Queue Size on a	, 0
			Series C Network Module2 -	78
		2.24.1.5		
			Series C Network Module2 - 79	
	2.24.2	Configu	uring Port Traffic on Series LC Network Modules 2 -	80
			Setting the CLP Threshold on a	
			Series LC Network Module 2 -	80
		2.24.2.2		
			Series LC Network Module 2 -	81
		2.24.2.3	Displaying Port Traffic on a	
			Series LC Network Module2 -	
	2.24.3	_	uring Port Traffic on Series LE Network Modules 2 -	83
		2.24.3.1	Setting the CLP Threshold on a	
			Series LE Network Module	83
		2.24.3.2	Configuring Port Queue Size on a	
			Series LE Network Module2 -	84
		2.24.3.3	Displaying Port Traffic on a	
	0.04.4	0	Series LE Network Module	
	2.24.4		uring Port Traffic on Series 1 Port Cards 2 -	87
		2.24.4.1	Setting the CLP Threshold on a Series 1 Port Card	07
		2 24 4 2	Configuring Port Queue Size on a	01
		2.24.4.2	Series 1 Port Card	ΩΩ
		2.24.4.3		
	2.24.5	_	uring Port Traffic on Series D Network Modules 2 -	
	2.24.5		Configuring Alternate CLP Threshold on a	30
		∠.∠⊣.∪. I	Series D Network Module2 -	90
		2 24 5 2	Configuring the CLP Threshold on a	50
			Series D Network Module	91

		2.24.5.3	Corrigo D Naturals Madula
		2.24.5.4	Series D Network Module
		2.24.3.4	Series D Network Module
		2.24.5.5	Scheduling Port Traffic on a
			Series D Network Module
		2.24.5.6	Displaying Port Traffic on a
			Series D Network Module
2.25	UBR Tag	gging Cor	nmand2 - 97
2.26	VBRBuf	fOB Port	Configuration Commands
2.27	VBROB	Port Con	figuration Commands
CHAP	TER 3	Port Card	d Command
3.1	Displayi	ng ATM P	ort Card Information
CHAP	TER 4	Profile C	onfiguration Commands
4.1			Configuration Commands4 - 2
	4.1.1		g a EPD/PPD Profile
	4.1.2		g a EPD/PPD Profile
	4.1.3		ing EPD/PPD Profile Information
4.2	FRF.8 P	rofile Con	figuration Commands
	4.2.1	Deletin	g a FRF.8 Profile
	4.2.2	Creatin	g a FRF.8 Profile
	4.2.3		ing FRF.8 Protocol Information
	4.2.4		ing FRF.8 Profile Information
4.3	Frame R		e Configuration Commands
	4.3.1		g a Frame Relay Rate Profile4 - 9
	4.3.2		g a Frame Relay Rate Profile
	4.3.3		ing Frame Relay Rate Profile Information4 - 11
4.4		_	on Commands
	4.4.1		g a FUNI Profile4 - 12
	4.4.2		g a FUNI Profile
4 =	4.4.3		ing FUNI Profile Information
4.5		_	Commands
	4.5.1		g an LMI Profile
	4.5.2		g an LMI Profile4 - 15
4.0	4.5.3		ing LMI Profile Information
4.6			Profile Configuration Commands4 - 18
	4.6.1		g a Generic Service Profile
	4.6.2 4.6.3		g a Generic Service Profile
	4.0.3	Display	ing Generic Service Profile Information

CHAP	TER 5	QOS Expansion Table Commands						
5.1	Deletin	g a QOS Expansion Table Entry5 -	2					
5.2	Creatin	g a QOS Expansion Table Entry 5 -	3					
5.3	Display	ing the QOS Expansion Table	4					
CHAP	TER 6	QOS Extension Table Commands						
6.1	Deletin	g a QOS Extension Table Entry	1					
6.2	Modify	ng a QOS Extension Table Entry	1					
6.3	Creatin	g a QOS Extension Table Entry	2					
6.4		ing the QOS Extension Table						
CHAP	TER 7	RS-232 Serial Port Commands						
7.1	Display	ing Serial Port Information	2					
CHAP	TER 8	Security Configuration Commands						
8.1	IP Acc	ess Configuration Commands8 -	1					
	8.1.1	Configuring an Authorized IP Address 8 -						
	8.1.2	Deleting an Authorized IP Address 8 -						
	8.1.3	Rejecting/Accepting Strict Source Routed Packets8 -						
	8.1.4	Rejecting/Accepting Loose Source Routed Packets						
	8.1.5	Rejecting/Accepting All Packets						
	8.1.6	Displaying IP Access Information						
8.2		os Configuration Commands						
	8.2.1	Setting or Deleting the Kerberos Realm						
	8.2.2	Displaying Kerberos Configuration Information						
	8.2.3	Host Table Commands						
		8.2.3.1 Adding Entries to the Host Table						
		8.2.3.2 Deleting Entries from the Host Table 8 - 1 8.2.3.3 Displaying IP Address and Host Name Mappings 8 - 1						
	8.2.4	Kerberos v5srvtab File Commands						
	0.2.4	8.2.4.1 Installing the v5srvtab File on the Switch						
		8.2.4.2 Deleting the v5srvtab File						
		8.2.4.3 Displaying the Contents of the v5srvtab File 8 - 1						
8.3	Login l	Jserid Configuration Commands 8 - 1	13					
	8.3.1	Backing Up the Login Userid File 8 - 1	13					
	8.3.2	Deleting a Userid 8 - 1						
	8.3.3	Enabling or Disabling Fingering						
	8.3.4	Modifying a Userid						
	8.3.5	Creating a Userid						
	8.3.6	Setting or Changing a Password for a Userid 8 - 1						
	8.3.7	Restoring the Login File						
	8.3.8	Configuring SecurID	18					

	8.3.8.1	Getting the Securld Configuration File	8 - 18
	8.3.8.2		
	8.3.8.3	Displaying the SecurID File	8 - 19
	8.3.8.4	-1 -7 3	
		aying and Changing Unlisted User Privileges	
		aying the Current Userid	
8.4	Configuring NS	SAP Filtering	8 - 22
	8.4.1 Conf	iguring NSAP Filters	8 - 22
	8.4.1.1	5 1	
	8.4.1.2	· · · · · · · · · · · · · · · · · · ·	
	8.4.1.3	3 3	
	8.4.1.4		
	8.4.1.5	1 7 5	
	8.4.2 Conf	iguring NSAP Filter for Interfaces	
	8.4.2.1	· · · · · · · · · · · · · · · · · · ·	
	8.4.2.2	5 5	
	8.4.2.3	1 7 3	
8.5		mplates	
		ting a Template	
	8.5.2 Crea	ting a Template	8 - 29
	8.5.3 Modi	fying a Template	8 - 30
	8.5.4 Displ	aying Template Information	8 - 31
CHAP	TER 9 Signal	ling Commands	
9.1	Deleting a Sign	alling Channel	9 - 1
9.2		nalling Channel	
9.3	, , ,	nalling Channel	
9.4		nalling Channels	
•		aying ATM Layer Information for Signalling Channels	
		aying ATM Range Information for Signalling Channels	
		aying Protocol Information for Signalling Channels	
		aying ATM Routing Information for Signalling Channels	
		aying Timer Information for Signalling Channels	
	•	aying Public UNI Information for Signalling Channels	
		aying IE Filter Information for Signalling Channels	
		aying NSAP Filter Information for Signalling Channels	
9.5	•	Table Commands	
0.0	•	aging VPCI Mapping Group Table Entries	
	9.5.1 Mana 9.5.1.1		
	9.5.1.2		
	9.5.1.2		9 - 23
	3.3.1.3	Existing VPCI Mapping Group	0 - 2/
		Existing vi Oi Mapping Oloup	9 - 24

	9.5.2	Managin 9.5.2.1 I 9.5.2.2	g VPCI M Deleting a Creating a	VPCI Mapping Group ap Table Entries VPCI Map Index New VPCI Map Index VPCI-VPI-Port Mappings	9 - 25 9 - 25 9 - 25
СНАРТ	ER 10	SNMP Co	nfiguratio	on Commands	
10.1	Configu	ring the SN	IMP Comr	munity Access	10 - 1
10.2	Enablin	g or Disabli	ng SNMP	SETs	10 - 2
10.3	Display	ing SNMP S	SET Inforn	nation	10 - 2
10.4	Configu	ring SNMP	Traps		10 - 3
	10.4.1	Configur	ing Trap D	Destinations	10 - 3
				Trap Destination	
				Trap Destination	
				Trap Destination Information	
	10.4.2			NMP Trap Log	
				the SNMP Trap Log	
			-	g the Trap Log Threshold	
			.4.2.2.1	Modifying the Trap Log Threshold	
				5 1 5	
				1 7 0 1 0	10 0
_			_	on Commands	
11.1				Path	
11.2		_	-	g Path	
11.3	Showin	g the SPAN	IS Signalli	ng Path Configuration	11 - 5
СНАРТ	ER 12	SPVX Con	nfiguratio	n Commands	
12.1	SPVCC	Configurat	ion Comm	nands	12 - 1
	12.1.1	SPANS S	SPVCC C	onfiguration Commands	12 - 1
		12.1.1.1	Deleting a	SPANS SPVC	12 - 2
				SPANS SPVC	
				SPANS SPVC Information	
	12.1.2			figuration Commands	
				a Destination NSAP for a PNNI SPVC	
			-	g PNNI Point-to-Point SPVCs	12 - 6
		12	.1.2.2.1	Batch Command for PNNI Point-to-Point SPVCs	12 E
		12	.1.2.2.2	Creating a PNNI Point-to-Point SPVC	
			.1.2.2.2	Using DTLs with PNNI	12 - 0
		12		Point-to-Point SPVCs	2 - 13
		12	.1.2.2.4	Modifying a PNNI Point-to-Point SPVC	

12.1.2.2.5	Deleting	a PNNI Point-to-Point SPVC12 - 14
12.1.2.2.6	Displayin	g PNNI Point-to-Point
	SPVC In	formation12 - 15
12	2.1.2.2.6.1	Displaying Basic PNNI Point-to-Point
		SPVC Information 12 - 16
12	2.1.2.2.6.2	Displaying Advanced PNNI Point-to-Point
		SPVC Information
12	2.1.2.2.6.3	Displaying Summary PNNI Point-to-Point
		SPVC Information
12.1.2.3 Configu	ring PNNI P	oint-to-Multipoint SPVCs 12 - 22
12.1.2.3.1		ommand for PNNI
	Point-to-f	Multipoint SPVCs
12.1.2.3.2	_	
	Point-to-I	Multipoint SPVC
12.1.2.4 Using D	TLs with FT	-PNNI
Point-to-	-Multipoint S	SPVCs12 - 30
12.1.2.4.1		g a PNNI
	Point-to-l	Multipoint SPVC
12.1.2.4.2	Deleting	a PNNI
	Point-to-f	Multipoint SPVC
12.1.2.4.3	Adding P	Parties to a PNNI PMP SPVC12 - 32
12.1.2.4.4	Deleting	Parties from a
	PNNI PN	1P SPVC
12.1.2.4.5		ing Rerouting for PNNI
	Point-to-I	Multipoint SPVCs12 - 34
12.1.2.4.6	Displayin	g a Summary of PNNI
	Point-to-I	Multipoint SPVCs
12	2.1.2.4.6.1	Displaying Basic PNNI Point-to-Multipoint
		SPVC Information
12	2.1.2.4.6.2	Displaying Advanced PNNI
		Point-to-Multipoint SPVC Information12 - 38
12	2.1.2.4.6.3	Displaying Summary PNNI Point-to-Multipoint
		SPVC Information
12.1.2.5 Configu	ring PNNI S	SPVC Parameters12 - 41
12.1.2.5.1	Configuri	ng the DTL Back-off Mechanism for
	PNNI Po	int-to-Point SPVCs
12	2.1.2.5.1.1	Configuring the DTL Back-off Interval for PNNI
		Point-to-Point SPVCs12 - 41
12	2.1.2.5.1.2	Displaying the DTL Back-off Interval for PNNI
		Point-to-Point SPVCs12 - 42
12.1.2.5.2	Configuri	ing Pacing for PNNI SPVCs12 - 42
12	2.1.2.5.2.1	Setting the PNNI SPVC
		Pacing Interval

	12.1.2.5.2.2	Setting the Number of PNNI
		SPVC Calls
	12.1.2.5.2.3	Setting Pacing for PNNI PMP
		SPVC Parties
	12.1.2.5.2.4	Displaying the PNNI SPVC
		Pacing Parameters 12 - 44
		ing the Priority for
		PVCs
	12.1.2.5.3.1	Configuring the Lowest Priority Value
	12.1.2.5.3.2	for PNNI SPVCs
	12.1.2.5.3.2	PNNI SPVCs
	12.1.2.5.4 Configur	ing Rerouting for PNNI
		Point SPVCs
	12.1.2.5.4.1	Setting the Interval between the Rerouting of
	121112.01111	PNNI Point-to-Point SPVCs 12 - 46
	12.1.2.5.4.2	Setting the Number of PNNI Point-to-Point SPVCs
		to be Rerouted per Interval 12 - 47
	12.1.2.5.4.3	Displaying PNNI Point-to-Point SPVC
		Reroute Information 12 - 47
	12.1.2.5.4.4	Setting the Improvement Threshold
		for Rerouting
		ing the Default Load-balanced UBR
		th for SPVCs
	12.1.2.5.5.1	9 9
	10.1.0.5.5.0	Bandwidth for SPVCs
	12.1.2.5.5.2	Displaying the Default Load-balanced UBR
	12.1.2.5.6. Configur	Bandwidth for SPVCs
		Notation for a Port Identifier
12.2	. , .	
12.2	G	
		Cs
	12.2.3 Creating all SF VF C	NNI SPVPs
	12.2.4 Modifying an SPVPC	
	<u> </u>	eters
	0 0	ck-off Mechanism for SPVPCs 12 - 60
	12.2.6.1.1 Configur	ing the Back-off
	Interval f	or SPVPs
		ng the Back-off
	Interval f	for SPVPs

		12.2.6.2 Configuring Pacing for SPVPCs
		12.2.6.2.1 Setting the SPVPC Pacing Interval
		12.2.6.2.2 Setting the Number of SPVPC Calls 12 - 6
		12.2.6.2.3 Displaying the SPVP Pacing Parameters 12 - 62
		12.2.6.3 Configuring the Priority for SPVPCs
		12.2.6.3.1 Configuring the Lowest Priority
		Value for PNNI SPVCs
		12.2.6.3.2 Displaying the Lowest Priority Value
		for PNNI SPVCs
		12.2.6.4 Configuring Rerouting for SPVPCs
		12.2.6.4.1 Setting the Interval between the
		Rerouting of SPVPCs
		12.2.6.4.2 Setting the Number of SPVPCs to be
		Rerouted per Interval
		12.2.6.4.3 Displaying PNNI SPVPC
		Reroute Information
		12.2.6.4.4 Setting the Improvement
		Threshold for Rerouting
	4007	12.2.6.5 Configuring Enhanced SPVC Traps
	12.2.7	Displaying the BNP Notation for a Port Identifier
	12.2.8	Displaying SPVP Information
		12.2.8.1 Displaying Basic SPVP Information
		12.2.8.2 Displaying Advanced SPVP Information
		12.2.8.3 Displaying Summary SPVP Information
CHAP	TER 13	Switch Configuration Commands
13.1	Configu	uring Call Records
	13.1.1	Call Record Filters
	13.1.1	13.1.1.1 Adding Call Record Filters
		13.1.1.2 Modifying Call Record Filters
		13.1.1.3 Deleting Call Record Filters
		13.1.1.4 Displaying Call Record Filters
	13.1.2	
	13.1.2	Configuring Call Record Memory
		13.1.2.1 Modifying Memory Pool Configuration
		13.1.2.2 Resetting Call Record Memory Configuration
	40.4.0	13.1.2.3 Displaying Call Record Memory Configuration
	13.1.3	Configuring Call Record File Transfer Variables
	13.1.4	Modifying Call Record Variables
	13.1.5	Setting the Data Server Password
	13.1.6	Enabling Call Record Transfers
	13.1.7	Deleting Call Record Configuration
	13.1.8	Disabling Call Record Transfers
	13.1.9	Showing Call Record Information

13.2	Configuring Performance Monitoring Records	۱3 -	15
	13.2.1 Creating Performance Monitoring Variables	3 -	15
	13.2.2 Modifying Performance Monitoring Variables		
	13.2.3 Setting the Data Server Password		
	13.2.4 Enabling Performance Monitoring Transfers		
	13.2.5 Disabling Performance Monitoring Transfers		
	13.2.6 Deleting Performance Monitoring Variables		
	13.2.7 Displaying Performance Monitoring Information		
13.3	Configuring the Clock Scaling Factor	۱3 -	23
13.4	Configuring PVC/PVP Connection Preservation	۱3 -	24
13.5	Configuring the Switch Fabric ID	۱3 -	26
13.6	Configuring a Software License	I3 -	28
13.7	Setting or Changing the Switch Name 1	I3 -	29
13.8	Network Time Protocol Commands 1	I3 -	30
	13.8.1 Enabling/Disabling the NTP Server	I3 -	30
	13.8.2 Configuring Broadcast Clients		
	13.8.3 Managing the NTP Peer List		
	13.8.3.1 Adding an NTP Peer	l3 -	31
	13.8.3.2 Deleting an NTP Peer1		
	13.8.3.3 Displaying the NTP Peer List		
	13.8.4 Managing the NTP Restrict List		
	13.8.4.1 Creating Filters or Restrictions		
	13.8.4.2 Deleting an NTP Peer Filter		
	13.8.4.3 Displaying the NTP Peer Filters		
	13.8.5 Displaying NTP Peer Status		
	13.8.6 Displaying the Local Clock Loop Filter		
40.0	13.8.7 Displaying NTP Server Status and Version		
13.9	Configuring OAM Cell Processing on a Switch		
13.10	Setting the Maximum Number of Reserved VCIs for PMPs		
13.11	Setting the Minimum Number of Reserved VCIs for PMPs		
13.12	Configuring Memory Pools	۱3 -	41
	13.12.1 Configuring the Pool for Point-to-Point Calls	I3 -	42
	13.12.2 Configuring the Pool for Point-to-Multipoint Calls	۱3 -	42
	13.12.3 Displaying Configured Pools	۱3 -	43
13.13	Displaying the Switch Configuration	3 -	44
13.14	Setting the Time Zone	3 -	46
СНАРТ	ER 14 System Configuration Commands		
14.1	Displaying System Information	14	- 1
14.2	Dual SCP Configuration Commands	14	- 2

		iguring Dual SCP Automatic File Removal	
		iguring Dual SCP Automatic Synchronization	
		figuring SCP Failover	
		figuring the Controlling SCP	
		etting the Standby SCP	
		laying Dual SCP Information	
		ching over to the Standby SCP	
		chronizing Files Manually	
440		ng the Failover Threshold	
14.3		Changing the Prompt	
14.4		System Protocol	
14.5	System Log Co	onfiguration Commands	14 - 13
		laying the Address of the System Log Host	
		ng the Address of the System Log Host	
		ting the Address of the System Log Host	
		ing On/Off System Log Messages to the Console	
		oling or Disabling the Logging of Changes	
		.1 Displaying the Auditing State	14 - 17
	14.5.5.	.2 Changing and Displaying the	
		AMI Auditing State	14 - 18
	14.5.5.	3 Changing and Displaying the	
		SNMP Auditing State	14 - 20
	14.5.5.	4 Changing and Displaying the	44 00
	_	ILMI Auditing State	
14.6		Configuration Command	
14.7	Configuring the	Units for UPC Contracts	14 - 24
СНАР	TER 15 Timing	g Configuration Commands	
15.1	Configuring the	e Timing Mode	15 - 1
15.2		ing Information	
15.3		Switchclock	
	0 0		10 - 3
CHAP	_	guring the Traffic Descriptor Table	
16.1	Deleting a Traff	fic Descriptor Entry	16 - 1
16.2	Creating a Traff	fic Descriptor Entry	16 - 2
16.3	Displaying Traff	fic Descriptor Information	16 - 3
СНАР	TER 17 UPC C	Configuration Commands	
17.1		C Traffic Contract	17 - 1
17.1	_	C Traffic Contract	
11.2			
	17.2.1 Confi	figuring Advanced Options on UPC Contracts	17 - 5

17.3	Displaying the UPC Traffic Contracts	. 6
CHAP	ER 18 VCC Configuration Commands	
18.1	Batch Command for PVCs	. 1
18.2	Deleting a PVC 18 -	. 3
18.3	Creating a PVC	. 3
18.4	Displaying PVCs	5
CHAP	ER 19 VPC Configuration Commands	
19.1	Deleting a PVP	. 1
19.2	Creating a PVP	. 1
19.3	Displaying PVPs	4
CHAP	ER 20 VPT Configuration Commands	
20.1	Deleting a Virtual Path Terminator	. 2
20.2	Modifying a Virtual Path Terminator	. 3
20.3	Creating a Virtual Path Terminator	
20.4	Displaying Virtual Path Terminators	. 7
	20.4.1 Displaying Advanced VPT Information	. 8
	20.4.2 Displaying QoS Extension Information for VPTs	. 9

Index

Preface

This manual provides the technical information needed to configure the ATM Management Interface (AMI) for the *ForeRunner*[®] family of ATM Switches, *ForeRunnerLE*[®] Switches, *TNX*[™] ATM Switches, and ESX[™]-3000 Switch. This document was created for users with various levels of experience. If you have any questions or problems, please contact the FORE Systems Technical Assistance Center (TAC).

Chapter Summaries

- **Chapter 1 Introduction** Provides an overview of the AMI commands and menus that are described in this manual.
- **Chapter 2 Port Configuration Commands** Describes the configuration port level AMI commands and menus.
- **Chapter 3 Port Card Command** Describes the configuration portcard level AMI menu.
- **Chapter 4 Profile Configuration Commands** Describes the configuration profile level AMI commands and menus.
- **Chapter 5 QOS Expansion Table Commands** Describes the configuration gos level AMI commands and menus.
- **Chapter 6 QOS Extension Table Commands** Describes the configuration qosext level AMI commands and menus.
- **Chapter 7 RS-232 Serial Port Commands** Describes the configuration rs232 level AMI commands and menus.
- **Chapter 8 Security Configuration Commands** Describes the **configuration security** level AMI commands and menus.
- **Chapter 9 Signalling Commands** Describes the configuration signalling level AMI commands and menus.
- **Chapter 10 SNMP Configuration Commands** Describes the configuration snmp level AMI commands and menus.
- **Chapter 11 SPANS Configuration Commands** Describes the configuration spans level AMI commands and menus.

Chapter 12 - SPVX Configuration Commands - Describes the configuration spvx level AMI commands and menus.

Chapter 13 - Switch Configuration Commands - Describes the configuration switch level AMI commands and menus.

Chapter 14 - System Configuration Commands - Describes the configuration system level AMI commands and menus.

Chapter 15 - Timing Configuration Commands - Describes the configuration timing level AMI commands and menus.

Chapter 17 - UPC Configuration Commands - Describes the configuration upc level AMI commands and menus.

Chapter 18 - VCC Configuration Commands - Describes the configuration vcc level AMI commands and menus.

Chapter 19 - VPC Configuration Commands - Describes the configuration vpc level AMI commands and menus.

Chapter 20 - VPT Configuration Commands - Describes the configuration vpt level AMI commands and menus.

Related Manuals

References are made in this manual to the following manuals:

AMI Configuration Command Reference Manual, Part 1 - Describes the configuration level AMI commands and menus from configuration alarms> to configuration nsap>.

ATM Management Interface (AMI) Manual - Describes the root, display, operation, and statistics level AMI commands and menus.

ATM Switch Diagnostics and Troubleshooting Manual - Describes the debug level AMI commands and menus. Also, describes error messages, loopbacks, SCP diagnostics, and ATM Forum PNNI debugging information.

ATM Switch Network Configuration Manual - Discusses topics such as LAN Emulation, Classical IP, ATM Forum PNNI, and ForeThought PNNI.

These manuals can be found on the CD and can be read and printed using Acrobat Reader which is also included on the CD. If Acrobat Reader is installed locally, run Acrobat and open the manual from the $\mbox{\tiny DOCS}$ directory of the CD. If Acrobat Reader is not installed locally, run the Acrobat installer to load Acrobat Reader on your machine. Then run the $\mbox{\tiny ACROREAD}$. EXE file in the $\mbox{\tiny DOCS}$ directory of the CD.

Technical Support

In the U.S.A., customers can reach FORE Systems' Technical Assistance Center (TAC) using any one of the following methods:

1. Select the "Support" link from FORE's World Wide Web page:

http://www.fore.com/

2. Send questions, via e-mail, to:

support@fore.com

3. Telephone questions to "support" at:

800-671-FORE (3673) or 724-742-6999

4. FAX questions to "support" at:

724-742-7900

Technical support for customers outside the United States should be handled through the local distributor or via telephone at the following number:

+1 724-742-6999

No matter which method is used to reach FORE Support, customers should be ready to provide the following:

- A support contract ID number
- The serial number of each product in question
- All relevant information describing the problem or question

Typographical Styles

Throughout this manual, all specific commands meant to be entered by the user appear on a separate line in bold typeface. In addition, use of the Enter or Return key is represented as <ENTER>. The following example demonstrates this convention:

cd /usr <ENTER>

File names that appear within the text of this manual are represented in the following style: "...the fore_install program installs this distribution."

Command names that appear within the text of this manual are represented in the following style: "...using the flush-cache command clears the bridge cache."

Subsystem names that appear within the text of this manual are represented in the following style: "...to access the bridge subsystem..."

Parameter names that appear within the text of this manual are represented in the following style: "...using $\langle seg-list \rangle$ allows you to specify the segments for which you want to display the specified bridge statistics."

Any messages that appear on the screen during software installation and network interface administration are shown in Courier font to distinguish them from the rest of the text as follows:

```
.... Are all four conditions true?
```

Important Information Indicators

To call your attention to safety and otherwise important information that must be reviewed to ensure correct and complete installation, as well as to avoid damage to the FORE Systems product or to your system, FORE Systems utilizes the following *WARNING/CAUTION/NOTE* indicators.

WARNING statements contain information that is critical to the safety of the operator and/or the system. Do not proceed beyond a **WARNING** statement until the indicated conditions are fully understood or met. This information could prevent serious injury to the operator, damage to the FORE Systems product, the system, or currently loaded software, and is indicated as follows:

WARNING!



Hazardous voltages are present. To reduce the risk of electrical shock and danger to personal health, follow the instructions carefully.

CAUTION statements contain information that is important for proper installation/operation. Compliance with **CAUTION** statements can prevent possible equipment damage and/or loss of data and are indicated as follows:

CAUTION



You risk damaging your equipment and/or software if you do not follow these instructions.

NOTE statements contain information that has been found important enough to be called to the special attention of the operator and is set off from the text as follows:



If you change the value of the LECS control parameters while the LECS process is running, the new values do not take effect until the LECS process is stopped, and then restarted.

Laser Warning

Every FORE Systems network module having a single mode fiber optic interface contain a Class 1 laser.

Class 1 Laser Product: This product conforms to applicable requirements of 21 CFR 1040 at the date of manufacture.

Class 1 lasers are defined as products which do not permit human access to laser radiation in excess of the accessible limits of Class 1 for applicable wavelengths and durations. These lasers are safe under reasonably foreseeable conditions of operation.

WARNING!



Do not stare into the beam or view the beam with optical instruments.

Safety Precautions

For your protection, observe the following safety precautions when setting up equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. FORE Systems, Inc., is not responsible for regulatory compliance of a modified FORE product.

Preface

CHAPTER 1

Introduction

This manual contains a detailed description of the AMI configuration commands. The main configuration menu can be found at the root level. There are several commands available under configuration. Commands that are submenus are immediately followed by a ">" symbol. Typing configuration? at the prompt at the root level displays the configuration commands as follows:

myswitch::>	configuration	?
-------------	---------------	---

	· · · · · · · · · · · · · · · · · · ·		
alarms>	atmarp>	atmroute>	board>
cec>	ces>	fratm>	funi>
http>	ilmiproxy>	ip>	lane>
module>	nsap>	port>	portcard>
profile>	qos>	qosext>	rs232>
security>	snmp>	spans>	spvx>
switch>	system>	timing>	trafdesc>
signalling	g> upc>	VCC>	vpc>
vpt>			

Each of these commands has a submenu of commands. This manual describes the commands and menus from configuration port> to configuration vpt>. Please see Part 1 of the AMI Configuration Commands Reference Manual for descriptions of the commands and menus from configuration alarms> to configuration nsap>.



Not all of the above commands are displayed on every platform. The cec> commands are only displayed on the platforms that can support a CEC-Plus. The ces> commands are only displayed on the platforms that can support CEM network modules. The fratm> and funi> commands are only displayed on the platforms that can support FramePlus[™] network modules. The portcard> commands are only displayed on an ESX-3000.

Introduction

CHAPTER 2 Port Configuration Commands

These commands let you manage the configuration of the various ports. Type port? at the configuration level to display the available subcommands.

myswitch::configuration> port ?				
aal5packetdiscard	admin	aisrdi	cac	
cdvt	cesds1>	cese1>	delay	
ds1>	ds3>	e1>	e3>	
gcrapolicing	hysteresis	iwf>	j2	
led>	policing	pppolicing	show	
sonet>	taxi>	tp25>	traffic>	
ubrtagging	vbrbuffob	vbrob		



Not all of the above commands are displayed on every platform. The cese1> and cesds1> commands are only displayed on the platforms that can support CEM network modules. The ds1, ds3, e1, e3, and j2 commands are only displayed on platforms that can support these types of connections. The iwf> commands are only displayed on the platforms that can support FramePlus network modules.

2.1 AAL5 Packet Discard Command

This command lets you configure EPD/PPD on a per-port/per-class basis for all CBR, VBR, and/or UBR SVCs and/or PVCs. Enter the following parameters:



Even though packet discard is disabled on a certain port, class, or connection, partial packet policing may still occur on that same port, class, or connection. This is because partial packet policing occurs on the input side of the switch and partial packet discard occurs on the output side of the switch in the network module queues.



This command does not apply to the *FramePlus* network modules.

```
myswitch::configuration port> aal5packetdiscard <port> (cbr | vbr | ubr)
(allOn | allOff | svcOn | svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which packet discard is being configured.
cbr vbr ubr	The class of service for which you are configuring packet discard.
allOn	allon means all connections (SVCs and PVCs) of the specified class of service leaving on this port are subjected to packet discard.
allOff	allOff means no (SVCs and PVCs) connections of the specified class of service leaving on this port are subjected to packet discard.
svcOn	svcOn means all SVCs of the specified class of service leaving on this port are subjected to packet discard. PVCs are subjected to packet discard based on their UPC contract. This is the default.
svcOff	svcOff means no SVCs of the specified class of service leaving on this port are subjected to packet discard. PVCs are subjected to packet discard based on their UPC contract.

For example, to enable packet discard on all CBR SVCs and PVCs on port 2B4, enter the following parameters:

myswitch::configuration port> aal5packetdiscard 2b4 cbr all0n

2.2 Configuring the State of a Port

This command allows you to change the state of a port to be up (on-line) or down (off-line). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following:

myswitch::configuration port> admin <port> (up | down)

These parameters are defined as follows:

Parameter	Description
port	The number of port to be managed.
up down	up brings the designated port on-line. down takes the designated port off-line.



This command has no effect on Circuit Emulation Services (CES) DS1 and E1 network modules or on *FramePlus* DS1 and E1 network modules. To administer a CES port up or down, you must use the conf port cesds1 admin or conf port cese1 admin command. To administer a *FramePlus* port up or down, you must use the conf port iwf ds1 admin or conf port iwf e1 admin command.

2.3 AISRDI Port Configuration Commands

When a physical layer fault (loss of carrier, loss of frame, etc.) is detected on a port that has AIS/RDI (Alarm Indication Signal)/(Remote Defect Indication) enabled, OAM cells are generated for all through paths, originating paths, PVCs, and PNNI SPVCs that originate on that port. If a virtual path AIS condition is indicated (by receipt of F4 AIS cells on a terminating path), OAM cells are generated for only that path and for channels (PVCs and PNNI SPVCs) that originate on that path. SVCs and SPANS SPVCs do not generate AIS cells.

RDI cells are generated upstream from a terminating path whenever an OAM condition exists on the receiving side of that port. An AIS is sent in the downstream direction (away from the failure). Receiving an AIS cell indicates that a physical layer failure condition is present upstream from the receiver. An RDI cell is sent toward the failure when a physical fault or AIS condition is detected on the virtual path and channel. Receiving an RDI cell means that a fault exists in the transit pathway of the virtual connection described by the RDI cell. This command lets you enable or disable ATM layer AIS/RDI OAM cell generation on a specific port. Enter the following:



Currently, AIS/RDI OAM cell generation is supported only for point-to-point connections.

myswitch::configuration port> aisrdi <port> (enable | disable)

These parameters are defined as follows:

Parameter	Description
enable disable	enable means OAM cells are generated when AISs and RDIs are detected. disable means AISs and RDIs are ignored when they are detected. No OAM cells are generated. The default is disable.



If OAM cell generation is enabled on any ports using this command, that condition may be overridden using conf switch oam disable. In that case, the port level settings are still retained, but OAM cell generation ceases on all ports on the board. When conf switch oam enable is entered, all ports on the board use their last port level settings again, so OAM cell generation starts again only on the ports on which it was last enabled.

2.4 CAC Port Configuration Command

By disabling Connection Admission Control (CAC) on a particular port, you allow connections to be set up without restrictions on the available bandwidth. However, note that if CAC is disabled on a given port, care must be taken. The switch may not be able to guarantee the bandwidth that has been allocated on the port. To configure CAC on a particular port, enter the following parameters:

myswitch::configuration port> cac <port> (enable | disable)

These parameters are defined as follows:

Parameter	Description
port	The port number on which CAC is to be configured.
enable disable	enable means CAC is active on this port. disable means CAC is not active on this port. The default is enable.

If you change the CAC state on a port, you will be asked to reset the network module. For example:

myswitch::configuration port> cac 1a3 disable

Changing the CAC state on a port must be followed by a reset of the network module for the new CAC setting to become effective.

Note that changing the CAC state from disabled to enabled may result in the loss of previously provisioned connections.

Change the CAC state [n]? y

Reset the network module [n]? **y**Network module 1A reset



The CAC state is always enabled on the control port (CTL), and is always disabled on CEM network modules and on the backplane module (E) on an *ASX*-1000, *ASX*-1200, and a *TNX*-1100. This command does not apply to the *FramePlus* network modules.

2.5 CDVT Port Configuration Command

This command lets you modify the input Cell Delay Variation Tolerance (CDVT) on a per-port basis. Enter the following parameters:

myswitch::configuration port> cdvt <port> <us>

These parameters are defined as follows:

Parameter	Description
port	The port number on which the CDVT is to be changed.
us	The new value for the CDVT setting, in microseconds.



This command does not apply to the *FramePlus* network modules.

2.6 DS1 CES Port Configuration Commands

These commands allow you to configure the ports on a DS1 CES network module. The following cesds1 commands are valid only when a DS1 CES network module is installed in the switch fabric. You can display the list of subcommands by typing cesds1? at the port level.

myswitch::configuration port> cesds1 ?
 admin framing length upstreamais
 linestatus loopback mode show



These commands are not available locally on an *ASX*-200WG nor on an LE 155 nor on an LE 25.

2.6.1 Enabling/Disabling CES on a Port

This command lets you enable or disable CES on a DS1 CES port. Enter the following:

myswitch::configuration port cesds1> admin <port> (up | down)

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which CES is to be enabled or disabled.
up down	Indicates whether CES is to be enabled or disabled on the selected port. up means that CES will be enabled. down means that CES will be disabled.

2.6.2 Configuring DS1 CES Port Framing

This command lets you change the framing mode on a DS1 CES port. Enter the following:

myswitch::configuration port cesds1> framing <port> (ESF | SF)

Parameter	Description		
port	The DS1 CES port for which the framing mode is being set.		
ESF SF	The type of framing for this port. ESF indicates that ESF (Extended Super Frame) framing will be used. SF indicates that SF (Super Frame) framing will be used.		

2.6.3 Configuring DS1 CES Port Line Length

This command lets you change the line length of a DS1 CES port to correspond to the physical cable attached to that port. This lets the DS1 CES port anticipate the strength of the received signal on the cable. Enter the following:

```
myswitch::configuration port cesds1> length <port>
(<130 | 130-260 | 260-390 | >390)
```

Parameter	Description			
port	The DS1 CES port for which the line length is being set.			
<130	The physical cable is shorter than 130 meters long			
130 - 260	The physical cable is from 130 to 260 meters long.			
260 - 390	The physical cable is from 260 to 390 meters long.			
>390	The physical cable is greater than 390 meters long.			

2.6.4 Enabling/Disabling Upstream AIS

This command lets you enable or disable sending AIS alarm signals to the upstream link when an LOS signal is detected. This command can be enabled or disabled on a per-port basis on a DS1 CES network module.



This command only applies to unstructured connections. If it is enabled on a port, the structured connections ignore this feature.

Enter the following:

myswitch::configuration port cesds1> upstreamais <port> (enabled | disabled)

These parameters are defined as follows:

Proceed (y/n): y

Parameter	Description	
port	The DS1 CES port on which AIS is being enabled or disabled.	
enabled disabled	enabled means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. disabled means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port. The default is disabled.	

If you have active connections on a port, and you enable this feature on that port, the connections will be disrupted. For example,

myswitch::configuration port cesds1> upstreamais 1a1 enabled

This port is currently active. If you proceed any connections will be interrupted.

2.6.5 Displaying DS1 CES Port Line Status

This command lets you display the current line status of each DS1 CES port. Enter the following:

```
        myswitch::configuration port cesds1> linestatus

        Rx
        Tx
        Rx
        Tx

        Port
        Alarm
        LOF
        LOF
        AlS
        LOF
        LOS
        Loopback

        2A1
        no
        no
        no
        no
        no
        yes
        off

        2A2
        no
        no
        no
        no
        no
        yes
        off

        2A3
        no
        no
        no
        no
        no
        yes
        off

        2A4
        no
        no
        no
        no
        no
        yes
        off

        2A5
        no
        no
        no
        no
        no
        no
        yes
        off

        2A6
        no
        no
        no
        no
        no
        yes
        off
```

Field	Description
Port	The DS1 CES port number.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the receiving port is experiencing a Loss of Frame (LOF).
Tx LOF	Indicates whether or not the transmit port is experiencing a Loss of Frame (LOF).
Rx AIS	Indicates whether or not the receiving port is experiencing an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the transmit port is experiencing an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the DS1 CES connection is experiencing a Loss of Frame (LOF).
LOS	Indicates whether or not the DS1 CES connection is experiencing a Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.

2.6.6 Configuring DS1 CES Port Loopback

This command lets you designate the type of loopback on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> loopback <port> (line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which the loopback mode is to be changed.
line	line loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Cells that are switched to this port are not sent over the line.
none	none designates that no loopback will take place. This is the default setting.

2.6.7 Configuring the DS1 CES Port Line Coding

The mode command lets you configure the line coding for a particular DS1 CES port. Enter the following:

myswitch::configuration port cesds1> mode <port> (B8ZS | AMI)

Parameter	Description			
port	The DS1 CES port on which the line coding is to be changed.			
B8ZS AMI	The type of coding to be used. B8ZS means that Binary 8-Zero Substitution will be used. AMI means that Alternate Mark Inversion will be used. (See the <i>Glossary</i> .)			

2.6.8 Displaying the DS1 CES Port Configuration

This command lets you display the current configuration of each DS1 CES port. Enter the following parameters:

mysw	itch::	configura	ation por	rt ces	sds1> sho v	▼			
Port	State	Framing	Carrier	Line	Loopback	Port	Line	Line	UpStr
		Mode	State	Code	State	Timing	Length	Status	AIS
2A1	down	ESF	no	B8ZS	none	internal	<130	64	no
2A2	down	ESF	no	B8ZS	none	internal	<130	64	no
2A3	down	ESF	no	B8ZS	none	internal	<130	64	no
2A4	down	ESF	no	B8ZS	none	internal	<130	64	no
2A5	down	ESF	no	B8ZS	none	internal	<130	64	no
2A6	down	ESF	no	B8ZS	none	internal	<130	64	no

Field	Description			
Port	The DS1 CES port number and the state of the port (up or down).			
State	The current administrative state of this port. Can be up (on-line) or down (off-line).			
Framing Mode	The type of framing used on the line. If the port is running in unstructured mode, the framing mode for the port is overridden, and this field will display as ${\tt N/A}$.			
Carrier State ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected on this port.			
Line Code	The type of line coding used on the port.			
Loopback State	The loopback mode on the port.			
Port Timing	The source of the timing on this port. The values are one of: SNP> indicating the board/ network module/port from which the timing is being extracted, srts indicating that srts is being used on this port, fabric < X> where X is 1, 2, 3, or 4 indicating that timing is being sourced from another switch fabric (only applicable to an ASX-1000, ASX-1200, or TNX-1100 , network indicating that the clock is being derived from the line itself, or crystal indicating that the crystal on the network module itself is being used.			
Line Length	The length, in meters, of the physical cable attached to this port.			
Line Status	The line status of the DS1 CES port.			
UpStr AIS	yes means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. no means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port.			

^{1.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.7 CESE1 Port Configuration Commands

These commands let you modify various aspects of the configuration of the ports on a E1 CES network module. The following cesel commands are available only when a E1 CES network module is installed in the switch fabric. To list the available subcommands, type cesel? at the port level.



These commands are not available locally on an ASX-200WG nor on an LE 155 nor on an LE 25 switch.

2.7.1 Enabling/Disabling CES on a Port

This command lets you enable or disable Circuit Emulation Services (CES) on a particular E1 CES port. Enter the following:

myswitch::configuration port cesel> admin <port> (up | down)

Parameter	Description	
port	The E1 CES port on which CES is to be enabled or disabled.	
up down	Indicates whether CES is to be enabled or disabled on the selected port. up means that CES will be enabled. down means that CES will be disabled.	

2.7.2 Configuring CRC4 Framing on an E1 CES Port

This command lets you change the CRC4 framing type on a E1 CES port. This command lets you specify whether or not the E1 CES port performs a CRC4 error check. Enter the following:

```
myswitch::configuration port cesel> crc4 <port> (ON | OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which the CRC4 framing type is being changed.
ON OFF	OFF means that CRC4 error checking is disabled on this port. OFF is the default. ON means that CRC4 error checking is enabled on this port.

2.7.3 Reserving TS16 for Signalling on an E1 CES Port

This command lets you specify whether or not timeslot 16 (TS16) is reserved for signalling information on a E1 CES port. Enter the following:

```
myswitch::configuration port cesel> ts16 <port> (ON | OFF)
```

Parameter	Description
port	The E1 CES port on which TS16 is being changed.
ON OFF	$ \begin{tabular}{ll} $

2.7.4 Enabling/Disabling Upstream AIS

This command lets you enable or disable sending AIS alarm signals to the upstream link when an LOS signal is detected. This command can be enabled or disabled on a per-port basis on an E1 CES network module.



This command only applies to unstructured connections. If it is enabled on a port, the structured connections ignore this feature.

Enter the following:

myswitch::configuration port cesel> upstreamais <port> (enabled | disabled)

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which AIS is being enabled or disabled.
enabled disabled	enabled means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. disabled means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port. The default is disabled.

If you have active connections on a port, and you enable this feature on that port, the connections will be disrupted. For example,

myswitch::configuration port cesel> upstreamais 1a1 enabled This port is currently active. If you proceed any connections will be interrupted. Proceed (y/n):

2.7.5 Displaying E1 CES Port Line Status

This command lets you display the current line status of each E1 CES port. Enter the following:

myswitch::configuration port cesel> linestatus												
		Rx	Tx	Rx	Tx				TS16	FarEndTx	${\tt NearEndTx}$	NearEnd
Port	Alarm	LOF	LOF	AIS	AIS	LOF	LOS	Loopback	AIS	TS16LOMF	TS16LOMF	TestCode
3C1	no	no	no	no	no	no	no	off	no	no	no	No code
3C2	no	no	no	no	no	no	no	off	no	no	no	No code
3C3	no	no	no	no	no	no	no	off	no	no	no	No code
3C4	no	no	no	no	no	no	no	off	no	no	no	No code
3C5	no	no	no	no	no	no	no	off	no	no	no	No code
3C6	no	no	no	no	no	no	no	off	no	no	no	No code

Field	Description
Port	The E1 CES port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.
TS16 AIS	Indicates whether AIS is being received in timeslot 16.
FarEndTx TS16LOMF	Indicates whether Loss Of Multiframe (LOMF) is occurring at the far end in timeslot 16.
NearEndTx TS16LOMF	Indicates that the port is experiencing a Loss Of Multiframe (LOMF) condition in timeslot 16.
NearEnd TestCode	Indicates that the port is currently transmitting a test pattern.

2.7.6 Configuring E1 CES Port Loopback

This command lets you designate the type of loopback on an E1 CES port. Enter the following:

myswitch::configuration port cesel> loopback <port> (line | none)

Parameter	Description
port	The E1 CES port on which the loopback mode is to be changed.
line	line loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Cells that are switched to this port are not sent over the line.
none	none designates that no loopback will take place. This is the default setting.

2.7.7 Displaying the E1 CES Port Configuration

This command lets you display the current configuration of each E1 CES port as follows:

myswi	itch::c	config	guration	port ces	se1> show	₹				
Port	State	CRC4	TS16	Carrier	Line	Loopback	Port	Line	Line	UpStr
		Mode	Framing	State	Coding	State	Timing	Imp.	Status	AIS
1A1	up	N/A	N/A	no	HDB3	none	crystal	120	64	no
1A2	down	off	on	no	HDB3	none	crystal	120	1120	no
1A3	down	off	on	no	HDB3	none	crystal	120	1120	no
1A4	down	off	on	no	HDB3	none	crystal	120	1120	no
1A5	down	off	on	no	HDB3	none	crystal	120	1120	no
1A6	down	off	on	no	HDB3	none	crystal	120	1120	no

Field	Description
Port	The E1 CES port number and the state of the port (up or down).
State	The current administrative state of this port. Can be up (on-line) or down (off-line).
CRC4 Mode	off means that CRC4 error checking is disabled on this port. on means that CRC4 error checking is enabled on this port. If the port is running in unstructured mode, the framing mode for the port is overridden, and this field will display as N/A.
TS16 Framing	off means that timeslot 16 is used as another data channel on this port. on means that timeslot 16 is reserved for signalling information. If the port is running in unstructured mode, the framing mode for the port is overridden, and this field will display as N/A.
Carrier State ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected on this port.
Line Coding	The type of line coding used on the port.
Loopback State	The loopback mode on the port.
Port Timing	The source of the timing on this port. The values are one of: <bnp> indicating the board/ network module/port from which the timing is being extracted, srts indicating that srts is being used on this port, fabric <x> where X is 1, 2, 3, or 4 indicating that timing is being sourced from another switch fabric (only applicable to an ASX-1000, ASX-1200, or TNX-1100), network indicating that the clock is being derived from the line itself, or crystal indicating that the crystal on the network module itself is being used.</x></bnp>
Line Imp.	The value of the line impedance (in ohms, either 75 or 120).
Line Status	The line status of the E1 CES port.
UpStr AIS	yes means that if an LOS signal is detected, an AIS signal is sent upstream on the unstructured connections of the specified port. no means that an AIS signal is not sent upstream if an LOS signal is detected on the specified port.

^{1.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.8 Configuring Port Delay

This command lets you specify the amount Cell Delay Variation and the maximum Cell Transfer Delay that is introduced by the hardware on the input or output side of a given port.



This command is only useful if you are running PNNI on your switch and if you want to specify how much delay will be introduced at a given port. The PNNI router can use this information in determining the best hop-by-hop route to take. However, the CDV and maximum CTD are automatically calculated for you by the switch, so if these conditions are not represented in your network, it is highly recommended that you leave these values at the default settings.



This command does not apply to the *FramePlus* network modules.

myswitch::configuration port> delay <port> <input | output> (default | <cdv> <maxctd>)

Parameter	Description
port	The port number on which the CDV and CTD are being set.
input output	input means the modified values apply to the input side of the port. output means the modified values apply to the output side of the port.
default	Resets the CDV and CTD to the default values.
cdv	The new value for Cell Delay Variation on this port, in microseconds. The default is 1 microsecond.
maxctd	The new value for Cell Transfer Delay on this port, in microseconds. The default is 21 microseconds.

2.9 DS1 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on a DS1 network module. The following DS1 commands are available only when a DS1 network module is installed in the switch fabric. To list the available subcommands, type ? at the ds1 level.

2.9.1 Configuring DS1 Port Empty Cells

Empty cells are cells that are sent as "filler" or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a DS1 network module port. Enter the following parameters:

```
myswitch::configuration port ds1> emptycells <port> (idle | unassigned)
```

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle unassigned ¹	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is unassigned.

^{1.} Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.9.2 Configuring DS1 Port Line Length

This command lets you change the line length of a DS1 port to correspond to the physical cable attached to that port. This lets the DS1 network module receive the signal on the cable.

Check the unit Series, Revision, and Part numbers. To check the Series and Revision numbers, use the <code>conf mod show</code> command and look under the <code>Series</code> and <code>Rev</code>. fields, respectively. To check the Part number (ACCA####), remove the network module from the switch, and look at either the right edge of the top of the printed circuit board, or the top of the rear connector.



Series C, Revision 2, network modules with ACCA0055 part numbers should use ONLY the parameters that are appended with an A (e.g., Lt110A) in the table below.

To select the appropriate port line length, enter the following parameters:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt110	Use if the physical cable is shorter than 110 ft.
110-220	Use if the physical cable is between 110 and 220 ft.
220-330	Use if the physical cable is between 220 and 330 ft.
330-440	Use if the physical cable is between 330 and 440 ft.
440-550	Use if the physical cable is between 440 and 550 ft.
550-660	Use if the physical cable is between 550 and 660 ft.
Gt655 ¹	Use if the physical cable is greater than 655 ft.
Lt110A	Use if the physical cable is shorter than 110 ft.
110-220A	Use if the physical cable is between 110 and 220 ft.
220-330A	Use if the physical cable is between 220 and 330 ft.
330-440A	Use if the physical cable is between 330 and 440 ft.
440-550A	Use if the physical cable is between 440 and 550 ft.
550-660A	Use if the physical cable is between 550 and 660 ft.
Gt655A	Use if the physical cable is greater than 655 ft.

The DS1 network module is designed to meet all applicable requirements up to 655 feet of cable. Operation with cables greater than 655 feet in length is not guaranteed.

2.9.3 Configuring DS1 Port Loopback

This command lets you designate the type of loopback on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port dsl> loopback <port> (line | payload | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line payload diag none	Line connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. Payload means the DS1 stream received from the network has the DS1 overhead bits reinserted and is retransmitted to the network. Diagnostic connects the receiver to the transmitter. The DS1 stream transmitted by the SCP to a port is looped back to the SCP. The stream is still transmitted over the cable, but the incoming stream is ignored. none means no loopback will take place on this port. The default is none.

2.9.4 Configuring DS1 Port Mode

This command allows you to change the mode of operation on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> mode <port> (plcp | hcs)
```

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp hcs	plcp means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. hcs means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is hcs.

2.9.5 Configuring Pseudo-Random Bit Sequence Generation

This command allows you to enable Pseudo-Random Bit Sequence (PRBS) generation on a port on a DS1 network module.



This command is only available on Series D DS1 network modules.

Enter the following parameters:

```
myswitch::configuration port dsl> prbs <port> (off | on)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the PRBS is to be changed.
on off	on means that PRBS is enabled on this port and the Pseudo-Random Bit Sequence Generator (PRSG) will provide an unframed 2^15-1 test sequence as defined in Recommendation O.151 on this port. off means that PRBS is disabled on this port. The default is off.

2.9.6 Configuring DS1 Port Scrambling

This command allows you to change the scrambling mode on a port on the DS1 network module. Enter the following parameters:

```
myswitch::configuration port dsl> scrambling <port> (on | off)
```

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on off ¹	on indicates that cell payload scrambling is enabled on this port. off means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is off.

^{1.} The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.9.7 Showing the DS1 Port Configuration

This command allows you to display current information about all of the ports on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port dsl> show

Port Carrier Stat Mode Framing Loopback Timing PRBS Scram Length EmptyCells

1A1 no 0x124 hcs ESF none internal N/A off Lt110 unassigned

1A2 no 0x124 hcs ESF none internal N/A off Lt110 unassigned
```

Field	Description
Port	The port numbers of each E3 network module currently installed in the switch fabric.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected.
Stat	The DS1 line status of the port.
Mode	plcp means that the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. hcs means the port uses HCS (Header Check Sequence) cell delineation.
Framing	The type of framing used for the port. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. This is a read-only field.
Loopback	The loopback mode on the port. Can be: none, line, payload, or diagnostic.
Timing	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.
PRBS	on means that PRBS is enabled on this port and the Pseudo-Random Bit Sequence Generator (PRSG) will provide an unframed 2^15-1 test sequence as defined in Recommendation O.151. off means that PRBS is disabled on this port.
Scram	on means that payload scrambling is enabled on this port. off means that payload scrambling is disabled on this port.
Length	The length of the physical cable that is attached to this port.
EmptyCells ²	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

^{1.} A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

^{2.} Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.9.8 Configuring DS1 Port Timing

This command lets you change the timing source on a port on a DS1 network module. Enter the following parameters:

myswitch::configuration port dsl> timing <port> (network | internal)

Parameter	Description
port	The port number on which the line length is to be changed.
network internal	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.

2.10 DS3 Port Configuration Commands

These commands let you modify various aspects of the configuration of the ports on a DS3 network module. The following DS3 commands are available only when a DS3 network module is installed in the switch fabric. You can display the list of available subcommands by typing? at the ds3 level.

```
myswitch::configuration port ds3> ?
  emptycells framing length loopback
  mode scrambling show timing
```

2.10.1 Configuring DS3 Port Empty Cells

Empty cells are cells that are sent as "filler" or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a DS3 network module port. Enter the following parameters:

```
myswitch::configuration port ds3> emptycells <port> (idle | unassigned)
```

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle unassigned ¹	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is unassigned.

^{1.} Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.10.2 Configuring the DS3 Port Framing

This command allows you to designate the framing to be used on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> framing <port> (cchannel | cbit)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing is to be changed.
cchannel cbit	The type of framing for the port. cchannel (clearchannel) means that standard M23 framing is used on this port. The default is cbit (cbitparity).

2.10.3 Configuring DS3 Port Line Length

This command lets you change the line length of a DS3 port to correspond to the physical cable attached to that port. Enter the following parameters:

```
myswitch::configuration port ds3> length <port> (Lt225 | Gt225)
```

Parameter	Description
port	The port number on which the line length is to be changed.
Lt225	Use if the physical cable is shorter than 225 ft.
Gt225	Use if the physical cable is greater than 225 ft. This is the default.

2.10.4 Configuring the DS3 Port Loopback

This command lets you designate the type of loopback on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> loopback <port>
(cell | payload | diag | line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
cell	cell loopback means that the DS3 stream received from the network is unframed into ATM cells. The cells are reframed and transmitted back to the network.
payload	payload loopback mean the DS3 stream received from the network has the DS3 overhead bits re-inserted and is retransmitted to the network.
diag	diagnostic loopback connects the receiver to the transmitter. The DS3 stream transmitted by the switch to a port is looped back to the switch. The DS3 stream is still transmitted to the network, but the incoming DS3 stream is ignored.
line	line loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line.
none	none designates that no loopback will take place on this port. This is the default setting.

2.10.5 Configuring the DS3 Port Mode

This command allows you to change the framing mode on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> mode <port> (plcp | hcs)
```

Parameter	Description
port	The port number on which the framing mode is to be changed.
plcp hcs	plcp means the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. hcs means the port uses HCS (Header Check Sequence) based framing for cell delineation. The default is hcs.

2.10.6 Configuring the DS3 Port Scrambling

This command lets you change the scrambling mode on a port on the DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on ¹ off	on means that cell payload scrambling is enabled on this port. off means that cell payload scrambling is disabled on this port.

^{1.} Only the payload of the ATM cells is scrambled.

2.10.7 Showing the DS3 Port Configuration

This command allows you to display current information about all of the ports on the DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> show

Port Carrier Status Mode Framing Loopback Timing Scrambling EmptyCells Length

1A1 yes 0x1 plcp cbit none internal off unassigned Gt225

1A2 yes 0x1 plcp cbit none internal off unassigned Gt225
```

Field	Description
Port	The DS3 port number of the network module(s) currently installed in the switch.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected on this port. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
Status	The DS3 line status of the port.
Mode	Plcp means the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. Hcs means the port uses HCS (Header Check Sequence) based framing for cell delineation.
Framing	The type of framing used for the port. Can be cchannel or cbit.
Loopback	The loopback mode on the port. Can be cell, payload, diagnostic, line, or none.

Field	Description
Timing	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.
Scrambling	On means payload scrambling is enabled on the port. Off means payload scrambling is disabled on the port.
EmptyCells ²	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit = 1 and unassigned cells set the CLP bit = 0. Idle = invalid cell pattern and unassigned = unassigned.

^{1.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.10.8 Configuring DS3 Port Timing

This command lets you change the timing source on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> timing <port> (network | internal)
```

Parameter	Description
port	The port number on which the line length is to be changed.
network internal	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.

^{2.} Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.11 E1 Port Configuration Commands

These commands allow you to modify the configuration of the ports on an E1 network module. These commands are available only when an E1 network module is installed in the switch fabric. To display the list of available subcommands, type? at the e1 level.

myswitch::configuration port> e1 ?
 emptycells length loopback mode
 scrambling show timing

2.11.1 Configuring E1 Port Empty Cells

Empty cells are cells that are sent as "filler" or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on an E1 network module port. Enter the following:

```
myswitch::configuration port el> emptycells <port> (idle | unassigned)
```

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle unassigned ¹	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is idle.

^{1.} Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.11.2 Configuring E1 Port Line Length

This command lets you change the line length of an E1 port to correspond to the physical cable attached to that port. This allows the E1 network module to receive the signal on the cable.

Check the unit Series, Revision, and Part numbers. To check the Series and Revision numbers, use the <code>conf mod show</code> command and look under the <code>Series</code> and <code>Rev</code>. fields, respectively. To check the Part number (ACCA####), remove the network module from the switch, and look at either the right edge of the top of the printed circuit board, or the top of the rear connector.



Series C, Revision 2, network modules with ACCA0055 part numbers should use ONLY the parameters that are appended with an A (e.g., Lt110A) in the table below.

To select the appropriate port line length, enter the following parameters:

```
myswitch::configuration port el> length <port> (Lt110 | 110-220 | 220-330 | 330-440 | 440-550 | 550-660 | G703-75 | G703-120 | Lt110A | 110-220A | 220-330A | 330-440A | 440-550A | 550-660A | G703-75A | G703-120A)
```

Parameter	Description
port	The port number on which the line length is to be changed.
Lt110	Use if the physical cable is shorter than 110 ft.
110-220	Use if the physical cable is between 110 and 220 ft.
220-330	Use if the physical cable is between 220 and 330 ft.
330-440	Use if the physical cable is between 330 and 440 ft.
440-550	Use if the physical cable is between 440 and 550 ft.
550-660	Use if the physical cable is between 550 and 660 ft.
G703-75	Use if the physical cable is a G703 standard 75 ohm coaxial line.
G703-120	Use if the physical cable is a G703 standard 120 ohm symmetrical line.
Lt110A	Use if the physical cable is shorter than 110 ft.
110-220A	Use if the physical cable is between 110 and 220 ft.
220-330A	Use if the physical cable is between 220 and 330 ft.
330-440A	Use if the physical cable is between 330 and 440 ft.
440-550A	Use if the physical cable is between 440 and 550 ft.
550-660A	Use if the physical cable is between 550 and 660 ft.
G703-75A	Use if the physical cable is a G703 standard 75 ohm coaxial line.
G703-120A	Use if the physical cable is a G703 standard 120 ohm symmetrical line.

2.11.3 Configuring E1 Port Loopback

This command lets you designate the type of loopback on a port on an E1 network module. Enter the following parameters:

myswitch::configuration port el> loopback <port> (line | payload | diag | none)

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line payload diag none	Line loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. Payload loopback means the stream received from the network has the E1 overhead bits re-inserted and is retransmitted to the network. Diagnostic loopback connects the receiver to the transmitter. The E1 stream transmitted by the SCP to a port is looped back to the SCP. The stream is still transmitted over the cable, but the incoming stream is ignored. none means that no loopback will take place on this port. The default is none.

2.11.4 Configuring E1 Port Mode

This command allows you to change the method used for cell delineation on an E1 network module port.



This command is only available on Series C E1 network modules.

Enter the following parameters:

myswitch::configuration port el> mode <port> (plcp | hcs)

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp hcs	plcp means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. hcs means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is hcs.

2.11.5 Configuring E1 Port Scrambling

This command allows you to change the scrambling mode on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port el> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on off ¹	on indicates that cell payload scrambling is enabled on this port. off means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is on.

^{1.} The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.11.6 Showing the E1 Port Configuration

This command lets you display information about all of the ports on E1 network modules. Enter the following parameters:

```
myswitch::configuration port el> show
Port Carrier Stat Mode LineType Loopback Timing Scram Length
                                                      EmptyCells
1C1 no
                           none
                                   internal on
         0x244 N/A
                  CRC
                                               Lt110
                                                       idle
1C2 no
        0x244 N/A CRC
                          none internal on Lt110
                                                       idle
1C3 no
         0x244 N/A CRC
                          none
                                  internal on Lt110
                                                       idle
1C4 no
         0x244 N/A CRC
                          none internal on Lt110
                                                       idle
```

Field	Description
Port	The port numbers of each E1 network module currently installed in the switch fabric.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected.
Stat	The E1 line status of the port.
Mode	plcp means that the port uses PLCP framing for cell delineation. hcs means that the port uses HCS cell delineation.

Field	Description
LineType	The variety of E1 line implementing this circuit. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. This parameter is read-only.
Loopback	The loopback mode on the port.
Timing	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.
Scram	on means that payload scrambling is enabled on this port. off means that payload scrambling is disabled on this port.
Length	The length of the physical cable that is attached to this port.
EmptyCells ²	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

^{1.} A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

2.11.7 Configuring E1 Port Timing

This command lets you change the timing source on a port on an E1 network module. Enter the following parameters:

myswitch::configuration port el> timing <port> (network | internal)

Parameter	Description
port	The port number on which the line length is to be changed.
network internal	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.

^{2.} Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.12 E3 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on an E3 network module. These commands are available only when an E3 network module is installed in the switch fabric. To list the available subcommands, type? at the e3 level.

```
myswitch::configuration port> e3 ?
  emptycells loopback mode scrambling
  show timing
```

2.12.1 Configuring E3 Port Empty Cells

Empty cells are cells that are sent as "filler" or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on an E3 network module port. Enter the following:

```
myswitch::configuration port e3> emptycells <port> (idle | unassigned)
```

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle unassigned ¹	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is unassigned.

^{1.} Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.12.1.1 Configuring the E3 Port Loopback

This subcommand allows you to designate the type of loopback on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> loopback <port>
(cell | payload | diag | line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
cell payload diag line none	cell loopback means the E3 stream received from the network is unframed into ATM cells. The cells are then reframed and transmitted back to the network. payload loopback means the E3 stream received from the network has the E3 overhead bits re-inserted and is retransmitted to the network. diagnostic loopback connects the receiver to the transmitter. The E3 stream transmitted by the switch to a port is looped back to the switch. The E3 stream is still transmitted to the network, but the incoming E3 stream is ignored. line loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. none means that no loopback will take place on the port. The default is none.

2.12.2 Configuring E3 Port Mode

This command allows you to change the method used for cell delineation on an E3 network module port. Enter the following parameters:

```
myswitch::configuration port e3> mode <port> (plcp | hcs)
```

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp hcs	plcp means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. hcs means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is hcs.

2.12.3 Configuring E3 Port Scrambling

This command allows you to change the scrambling mode on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on off ¹	on indicates that cell payload scrambling is enabled on this port. off means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is on.

 $^{^{1.}}$ The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.12.4 Showing the E3 Port Configuration

This command allows you to display current information about an E3 network module. Enter the following parameters:

myswitch::configuration port e3> show							
Port	Carrier	Status	Mode	Loopback	Timing	Scrambling	EmptyCells
1D1	no	0x58	hcs	none	internal	on	unassigned
1D2	no	0x58	hcs	none	internal	on	unassigned
1D3	no	0x58	hcs	none	internal	on	unassigned
1D4	no	0x58	hcs	none	internal	on	unassigned

Field	Description
Port	The port numbers of each E3 network module currently installed in the switch fabric.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected.
Status	The E3 line status of the port.
Mode	plcp means that the port uses PLCP framing for cell delineation. hcs means that the port uses HCS cell delineation.
Loopback	The loopback mode on the port.

Field	Description
Timing	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.
Scram	on means that payload scrambling is enabled on this port. off means that payload scrambling is disabled on this port.
EmptyCells ²	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

2.12.5 Configuring E3 Port Timing

This command lets you change the timing source on a port on an E3 network module. Enter the following parameters:

myswitch::configuration port e3> timing <port> (network | internal)

Parameter	Description
port	The port number on which the line length is to be changed.
network internal	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.

^{2.} Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.13 GCRA Policing Command

Generic Cell Rate Algorithm (GCRA) policing ensures that traffic is regulated at the ATM layer on the input side of the network. This command allows you to configure GCRA policing on a per-port/per-class basis for all CBR and/or VBR PVCs and/or SVCs. Enter the following:

```
myswitch::configuration port> gcrapolicing <port> (cbr|vbr)
(allOn|allOff|svcOn|svcOff|default)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which GCRA policing is being configured.
cbr vbr	The class of service for which you are configuring GCRA policing.
allOn	allon means all connections (SVCs and PVCs) of the specified class of service arriving on this port are subjected to GCRA policing.
allOff	allOff means no connections (SVCs and PVCs) of the specified class of service arriving on this port are subjected to GCRA policing.
svcOn	svcOn means all SVCs of the specified class of service arriving on this port are subjected to GCRA policing. PVCs are policed based on their UPC contract.
svcOff	svcOff means no SVCs of the specified class of service arriving on this port are subjected to GCRA policing. PVCs are policed based on their UPC contract.
default	default means all CBR/VBR UNI SVCs and SVPs arriving on this port are subjected to GCRA policing. NNI SVCs and SVPs arriving on this port are NOT subjected to GCRA policing. CBR/VBR PVCs and PVPs are policed based on their UPC contract.



This command does not apply to the *FramePlus* network modules.

For example, if you want all CBR SVCs and PVCs to be policed on port 1D1, enter the following:

myswitch::conf port> gcrapolicing 1d1 cbr allOn

Use the configuration port show tm command to display GCRA policing:

myswitch::configuration port> show tm GCRA Policing AAL5 PP Pol. AAL5 Packet Discard Tag All CBR VBR CBR VBR CBR VBR Port CAC UBR UBR 1D1 enabled allon default alloff alloff svcOn svcOn svcOn svcOff 1D2 enabled default default allOff allOff svcOn svcOn svcOn svcOff 1D3 enabled default default allOff allOff svcOn svcOn svcOn svcOff 1D4 enabled default default alloff alloff svcOn svcOn svcOn svcOff 1CTL enabled default default alloff alloff N/A N/A N/A svcOff

See Section 2.20 for field definitions for this display.

2.14 Accelerated Remote Failure Detection

Signalling channels can be configured to react immediately to remote failures reported by SONET equipment and on failures reported by VP-AIS OAM cells. The time between remote failure detection and when the call is cleared can be configured (in milliseconds) to provide rapid failover as needed.

Hysteresis is the lag between making a change, such as increasing or decreasing power, and the response or effect of that change. A user-configurable hysteresis value can be applied that will require a physical error event to persist for at least a certain amount of time before the call is cleared.

If a hysteresis value is configured, it will be retained over a switch reboot or a hotswap. However, resetting the CDB will restore the hysteresis to its default value of 500 milliseconds.

```
myswitch::configuration port> hysteresis <port | all> (value | default)
```

The parameters are defined as follows:

Parameter	Description	
port all	The port number on which the hysteresis is being applied. A specific port in bnp notation can be entered or all can be entered to apply the hysteresis to all ports.	
value default	The specific value or default (500 ms) for which you are configuring the hysteresis. The value can be 0 through any positive integer (in milliseconds)	



This command only applies to switch platforms with SONET equipment.



The hysteresis value should be at least 100 milliseconds if the switch is interfacing with a protected facility such as one supporting SONET Automatic Protection Switching (APS) which occurs at 50 milliseconds.

For example, if you want to configure the hysteresis value as 200 milliseconds for port 2A4, enter the following:

myswitch::configuration port> hysteresis 2a4 200

To apply a hysteresis value for all ports, enter the following:

myswitch::configuration port> hysteresis all 200

To verify the change, enter the following:

myswitch::configuration port> show advanced

	Inp	ut	Output	:	
Port	CDV	maxCTD	CDV	maxCTD	Hysteresis
1A1	1	21	computed	computed	200
1A2	1	21	computed	computed	200
1A3	1	21	computed	computed	200
1A4	1	21	computed	computed	200
1D1	1	21	computed	computed	200
1D2	1	21	computed	computed	200
1D3	1	21	computed	computed	200
1D4	1	21	computed	computed	200
1CTL	0	0	computed	computed	N/A

Accelerated call clearing can be enabled or disabled when creating a new signalling channel. Enter disable or enable for the -accelerated_clear parameter when using the AMI command configuration signalling new Please see Section 9.3 in this manual for more information about creating a new signalling channel.

2.15 FramePlus Port Configuration Commands

These commands allow you to configure the ports on a *FramePlus* network module. To list the available subcommands, type ? at the iwf level.

```
myswitch::configuration port iwf> ?
ds1> e1>
```

2.15.1 FramePlus DS1 Line Interface Configuration Commands

These commands allow you to configure the DS1 line interface on a *FramePlus* network module. To list the available subcommands, type ? at the ds1 level.

2.15.1.1 Configuring the Status on a FramePlus DS1 Port

This command allows you to change the administrative state of a DS1 port on a *FramePlus* network module to be up (enabled) or down (disabled). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following parameters:

```
myswitch::configuration port iwf dsl> admin <port> (up | down)
```

Parameter Description	
port	The number of the FramePlus DS1 port to be managed.
up down	up enables the designated port. down disables the designated port.

2.15.1.2 Configuring the Framing Mode on a FramePlus DS1 Port

This command lets you change the framing mode on a *FramePlus* DS1 port. Enter the following:

```
myswitch::configuration port iwf dsl> framing <port> (ESF | SF)
```

These parameters are defined as follows:

Parameter Description	
port	The number of the FramePlus DS1 port to be configured.
ESF SF	The type of framing for this port. ESF indicates that ESF (Extended Super Frame) framing will be used. SF indicates that SF (Super Frame) framing will be used.

2.15.1.3 Configuring the Line Length on a FramePlus DS1 Port

This command lets you change the line length of a *FramePlus* DS1 port to correspond to the physical cable attached to that port. This lets the network module receive the signal on the cable. Enter the following:

```
myswitch::configuration port iwf ds1> length <port>
(<130 | 130-260 | 260-390 | >390)
```

Parameter	Description
port	The number of the FramePlus DS1 port to be configured.
<130	Use if the physical cable is shorter than 130 meters.
130-260	Use if the physical cable is between 130 and 260 meters.
260-390	Use if the physical cable is between 260 and 390 meters.
>390	Use if the physical cable is shorter than 390 meters.

2.15.1.4 Displaying Line Status Information on a FramePlus DS1 Port

This command lets you display the current line status of each *FramePlus* DS1 port. Enter the following:

```
myswitch::configuration port iwf ds1> linestatus

RX TX RX TX

Port Alarm LOF LOF AIS AIS LOF LOS Loopback

4A1 yes no no no yes yes yes off

4A2 yes no no no yes yes yes off

4A3 yes no no no yes yes yes off

4A4 yes no no no yes yes yes off
```

These fields are defined as follows:

Field	Description
Port	The number of the FramePlus DS1 port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.

2.15.1.5 Configuring the Loopback on a FramePlus DS1 Port

This command lets you designate the type of loopback on a port on a *FramePlus* DS1 network module. See the *ATM Switch Diagnostics and Troubleshooting Manual* for more information about loopbacks. Enter the following parameters:

myswitch::configuration port iwf dsl> loopback <port> (line | diag | none)

These parameters are defined as follows:

Parameter	Description
port	The number of the <i>FramePlus</i> DS1 port to be configured.
line diag none	line loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Frames that are switched to this port are not sent over the line. diag(nostic) means traffic received off the internal fabric is looped back onto the fabric. This is equivalent to a diagnostic loopback. none means no loopback will take place on this port. The default is none.

2.15.1.6 Configuring the Line Coding on a FramePlus DS1 Port

This command lets you configure the line coding for a particular *FramePlus* DS1 port. Enter the following:

myswitch::configuration port iwf ds1> mode <port> (B8ZS AMI)

Parameter Description		
port The number of the FramePlus DS1 port to be configured.		
up down	The type of coding to be used. B8ZS means that Binary 8-Zero Substitution will be used. AMI means that Alternate Mark Inversion will be used. (See the <i>Glossary</i> .)	

2.15.1.7 Displaying FramePlus DS1 Information

This command lets you display the current configuration of each *FramePlus* DS1 port. Enter the following:

myswi	ltch::c	onfigurat	cion port	iwf	ds1> £	show				
Port	Port	Framing	Carrier	Line	Loop	Port	Line	Fdl	Signal	Line
	Status	Mode	State	Code	Back	Timing	Length		Mode	Status
4A1	up	N/A	no	B8ZS	none	fabric1	<130	off	none	112
4A2	up	ESF	no	B8ZS	none	fabric1	<130	off	none	112
4A3	up	ESF	no	B8ZS	none	fabric1	<130	off	none	112
4A4	up	ESF	no	B8ZS	none	fabricl	<130	off	none	112

These fields are defined as follows:

Field	Description	
Port	The port number of the FramePlus DS1 port.	
Port Status ¹ The administrative state of the port (up or down).		
Framing Mode	The type of framing used on the line. If the port is running in unstructured mode, the framing mode for the port is overridden, and this field will display as N/A .	
Carrier State ² yes means a carrier has been detected on this port. no means a carrier has detected on this port.		
Line Coding	The type of line coding used on the port.	
Loopback	The loopback mode on the port.	
Port Timing	The source of the timing on this port.	
Line Length	The length, in meters, of the physical cable attached to this port.	
Fdl	This is a read-only field. off indicates that the FDL state machine is turned off for performance reports.	
Signal Mode	This is a read-only field. none indicates that no bits are reserved for signalling on this channel.	
Line Status	The line status of the FramePlus DS1 port.	

^{1.} The admin state or status under the conf port iwf ds1/e1, conf fratm, conf fratm pvc, conf funi and conf funi pvc levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under conf fratm pvc is administered down, the corresponding admin state under conf fratm is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

^{2.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.15.1.8 Configuring Timing on a FramePlus DS1 Port

This command lets you change the timing source on a port on a *FramePlus* DS1 network module. Enter the following parameters:

```
myswitch::configuration port iwf ds1> tx_timing <port> (network | system | internal)
```

These parameters are defined as follows:

Parameter Description		
port	The number of the FramePlus DS1 port to be configured.	
network	The recovered receive clock is used as the transmit clock.	
system	The recovered receive clock from another network module is used as the transmit clock. This is the default.	
internal	The crystal oscillator on the network module is used as the transmit clock.	

2.15.2 FramePlus E1 Line Interface Configuration Commands

These commands allow you to configure E1 line interface on a *FramePlus* network module. To list the available subcommands, type ? at the e1 level.

2.15.2.1 Configuring the Status on a FramePlus E1 Port

This command allows you to change the state of a E1 port on a *FramePlus* network module to be up (on-line) or down (off-line). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following parameters:

```
myswitch::configuration port iwf el> admin <port> (up | down)
```

Parameter	Description		
port	The number of the FramePlus E1 port to be managed.		
up down	up enables the designated port. down disables the designated port.		

2.15.2.2 Configuring CRC Checking on a FramePlus E1 Port

This command lets you change the CRC4 framing type on a *FramePlus* E1 port. This command lets you specify whether or not the port performs a CRC4 error check. Enter the following:

```
myswitch::configuration port iwf el> crc4 <port> (ON OFF)
```

These parameters are defined as follows:

Parameter Description	
port	The number of the FramePlus E1 port to be configured.
ON OFF	OFF means that CRC4 error checking is disabled on this port. OFF is the default. ON means that CRC4 error checking is enabled on this port.

2.15.2.3 Reserving TS16 for Signalling on a FramePlus E1 Port

This command lets you specify whether or not timeslot 16 (TS16) is reserved for signalling information on a *FramePlus* E1 port.



Changing this value currently has no effect. The default state is OFF, which means that timeslot 16 is used as a data channel and cannot be reserved.

Enter the following:

```
myswitch::configuration port iwf el> ts16 <port> (ON OFF)
```

Parameter	Description
port	The number of the <i>FramePlus</i> E1 port to be configured.
ON OFF	OFF means that timeslot 16 is used as another data channel on this port. ON means that timeslot 16 is reserved for signalling information. OFF is the default.

2.15.2.4 Displaying Line Status Information on a FramePlus E1 Port

This command lets you display the current line status of each *FramePlus* E1 port. Enter the following:

mysw	myswitch::configuration port iwf el> linestatus											
		Rx	Tx	Rx	Tx				TS16	FarEndTx	NearEndTx	NearEnd
Port	Alarm	LOF	LOF	AIS	AIS	LOF	LOS	Loopback	AIS	TS16LOMF	TS16LOMF	TestCode
1D1	yes	no	no	no	no	yes	yes	off	no	no	no	No code
1D2	yes	no	no	no	no	yes	yes	off	no	no	no	No code
1D3	yes	no	no	no	no	yes	yes	off	no	no	no	No code
1D4	yes	no	no	no	no	yes	yes	off	no	no	no	No code

These fields are defined as follows:

Field	Description
Port	The number of the FramePlus DS1 port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.
TS16 AIS	Indicates whether AIS is being received in timeslot 16.
FarEndTx TS16LOMF	Indicates whether Loss Of Multiframe (LOMF) is occurring at the far end in timeslot 16.
NearEndTx TS16LOMF	Indicates that the port is experiencing a Loss Of Multiframe (LOMF) condition in timeslot 16.
NearEnd TestCode	Indicates that the port is currently transmitting a test pattern.

2.15.2.5 Configuring Loopback on a FramePlus E1 Port

This command lets you designate the type of loopback on a port on a *FramePlus* E1 network module. See the *ATM Switch Diagnostics and Troubleshooting Manual* for more information about loopbacks. Enter the following parameters:

```
myswitch::configuration port iwf el> loopback <port> (line | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The number of the <i>FramePlus</i> E1 port to be configured.
line diag none	line loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Frames that are switched to this port are not sent over the line. diag(nostic) means traffic received off the internal fabric is looped back onto the fabric. This is equivalent to a diagnostic loopback. none means no loopback will take place on this port. The default is none.

2.15.2.6 Displaying FramePlus E1 Information

This command lets you display the current configuration of each *FramePlus* E1 port. Enter the following:

myswitch::configuration port iwf el> show									
Port	Port	CRC4	TS16	Carrier	Line	Loop	Port	Line	Line
	Status	Mode	Framing	State	Coding	Back	Timing	Imp.	Status
4D1	up	on	off	no	HDB3	none	4A crystal	120	4160
4D2	up	on	off	no	HDB3	none	4A crystal	120	4160
4D3	up	on	off	no	HDB3	none	4A crystal	120	4160
4D4	up	on	off	no	HDB3	none	4A crystal	120	4160

These fields are defined as follows:

Field	Description
Port	The number of the FramePlus E1 port.
Port Status ¹	The state of the port (up or down).
CRC4 Mode	off means that CRC4 error checking is disabled on this port. on means that CRC4 error checking is enabled on this port. If the port is running in unstructured mode, the framing mode for the port is overridden, and this field will display as N/A.
TS16 Framing	off means that timeslot 16 is used as another data channel on this port. on means that timeslot 16 is reserved for signalling information. If the port is running in unstructured mode, the framing mode for the port is overridden, and this field will display as N/A.

Field	Description			
Carrier State ²	yes means a carrier has been detected on this port. no means a carrier has not been detected on this port.			
Line Coding	The type of line coding used on the port.			
Loopback	The loopback mode on the port.			
Port Timing	The source of the timing on this port.			
Line Imp.	The value of the line impedance (in ohms, either 75 or 120).			
Line Status	The line status of the E1 CES port.			

^{1.} The admin state or status under the conf port iwf ds1/e1, conf fratm, conf fratm pvc, conf funi and conf funi pvc levels reflects the configured state of a port, service, or connection. The admin status is unique to a level. For example, if a connection under conf fratm pvc is administered down, the corresponding admin state under conf fratm is up, but the connection will not pass traffic. This is because the admin status of each of these entities has a direct effect on the operational status of all three entities. The operational status of these entities is currently not displayed in AMI.

If there are no *FramePlus* E1 network modules installed in the switch, then the following is displayed:

```
myswitch::configuration port iwf el> show
No DSX1-el port information is available
```

2.15.2.7 Configuring Timing on a FramePlus E1 Port

This command lets you change the timing source on a port on a *FramePlus* E1 network module. Enter the following parameters:

```
myswitch::configuration port iwf e1> tx_timing <port> (network | system | internal)
```

Parameter	Description
port	The number of the FramePlus E1 port to be configured.
network	The recovered receive clock is used as the transmit clock.
system	The recovered receive clock from another network module is used as the transmit clock. This is the default.
internal	The crystal oscillator on the network module is used as the transmit clock.

^{2.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.16 J2 Port Configuration Commands

These commands let you modify various aspects of the configuration of a J2 network module. The following J2 commands are available only when a J2 network module is installed in the switch fabric. To display the list of available subcommands, type j2? at the port level.

```
myswitch::configuration port> j2 ?
  emptycells line loopback show
  timing
```

2.16.1 Configuring Empty Cells on a J2 Port

Empty cells are cells that are sent as "filler" or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a J2 network module port. Enter the following:

```
myswitch::configuration port j2> emptycells cport> (idle | unassigned)
```

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle unassigned ¹	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is unassigned.

^{1.} Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.16.2 Configuring J2 Port Line Length

This command enables you to change the line length of a J2 network module port. Enter the following parameters:

```
myswitch::configuration port j2> line <port> (short | long)
```

These parameters are defined as follows:

Parameter	Description				
port	The port number on which the line length is to be changed.				
short long	The length of the physical cable attached to this port. If the line attached to the receive port has greater than 4 db of attenuation, then the line must be configured as long. If otherwise, then it must be configured as short. In general, if the cable is less than 20 feet, then configure the line as short.				

2.16.3 Configuring J2 Port Loopback

This command lets you configure the loopback mode on a J2 port. Enter the following:

```
myswitch::configuration port j2> loopback <port> (line | diag | none)
```

Parameter	Description
port	The port on which the loopback mode is to be changed.
line	line connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line.
diag	diagnostic loopback connects the receiver to the transmitter. The J2 stream transmitted by the switch to a port is looped back to the switch. The J2 stream is still transmitted to the network, but the incoming J2 stream is ignored.
none	none designates that no loopback will take place on this port. This is the default setting.

2.16.4 Showing J2 Port Configuration

This command allows you to display information about the configuration of the ports on a J2 network module. Enter the following parameters:

mysw	itch::cor	nfigurat	tion port j2>	show		
Port	Carrier	Status	LineLength	Loopback	Timing	EmptyCells
1C1	no	0xc0	short	none	internal	idle
1C2	no	0xc0	short	none	internal	unassigned
1C3	no	0xc0	short	none	internal	unassigned
1C4	no	0xc0	short	none	internal	unassigned

Field	Description
Port	The J2 port number of the network module(s) currently installed in the switch.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected on this port. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
Status	The J2 line status of the port.
LineLength	The length of the physical cable that is attached to this port. Can be short or long.
Loopback	The loopback mode on the port. Can be diagnostic, line, or none.
Timing	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.
EmptyCells	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting

^{1.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

2.16.5 Configuring J2 Port Timing

This command lets you change the timing source on a port on a J2 network module. Enter the following parameters:

myswitch::configuration port j2> timing <port> (network | internal)

Parameter	Description
port	The port number on which the line length is to be changed.
network internal	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.

2.17 LED Port Configuration Commands

These commands let you configure the a model for the front panel LEDs on all network modules except for Series LEs. You can display the list of available subcommands by typing led? at the port level.

2.17.1 LED Model Configuration

This command lets you select an LED model to use for setting the LED colors on a per-port basis on all network modules except Series LEs. Typically, the LAN LEDs blink when transmitting or receiving data on a port. Typically, the WAN LEDs illuminate solid green, unless an error condition exists on a port. Enter the following parameters:

```
myswitch::configuration port led> model <port> (lan1 | wan1 | lan2 | wan2)
```

Parameter	Description
port	The port number on which you want to configure an LED model.
lan1 wan1	For these models, RED means a fault in the receive direction, YELLOW means a fault in the transmit direction (Line Remote Defect Indication), AUTO/GREEN means no fault. Only the receive LED color is changed. These models show only three states and do not reflect the status of the Path Alarm Indications and Path Remote Defect Indications. lanl is the default value for all network modules.
lan2 wan2 ¹	For these models, RED means a line fault, YELLOW means a path fault, and AUTO/GREEN means no fault. The transmit LED shows faults in the transmit direction and the receive LED shows faults in the receive direction. These models provide a unique LED color pattern for all six fault states that can be detected by SONET signalling.

^{1.} For the lan2 and wan2 models, faults in the receive direction may make it impossible to detect certain faults in the transmit direction.

2.17.2 Displaying the LED Model Configuration

This command lets you display the LED models used for each port of all network modules except for Series LEs. Enter the following parameters:

myswitch::configuration port led> show					
Port	Type	rxLED	txLED	clkLED	Model
4D1	OC3	auto	auto	N/A	lan1
4D2	OC3	auto	auto	N/A	lan1
4D3	OC3	red	auto	N/A	lan1
4D4	OC3	red	auto	N/A	lan1
4E1	ASX-BP	N/A	N/A	N/A	N/A
4E2	ASX-BP	N/A	N/A	N/A	N/A
4E3	ASX-BP	N/A	N/A	N/A	N/A
4CTL	ASX-CTL	N/A	N/A	N/A	N/A

The fields in this display are defined as follows:

Field	Description
Port	The port number of the network module(s) currently installed in the switch (fabric).
Туре	The type of network module it is. ASX-BP are the intra-fabric ports on an ASX-1000, ASX-1200, or TNX-1100. ASX-CTL is the control port.
rxLED	The color of the receive LED for this port. Can be off, green, red, yellow, or auto. auto means that the LED is under hardware control. Typically, hardware control means that the LED is normally dark with green blinks to indicate data traffic.
txLED	The color of the transmit LED for this port. Can be off, green, red, yellow, or auto. auto means that the LED is under hardware control. Typically, hardware control means that the LED is normally dark with green blinks to indicate data traffic.
clkLED	This field only applies to the receive port LEDs on <i>FramePlus</i> network modules. green indicates that the port is providing the 8 KHz clock reference to the switch. off means that the port is not providing the 8 KHz clock reference to the switch.
Model	The LED models (lan1, wan1, lan2, or wan2) that has been assigned to this port.

You can also display the LED models for a single port. Enter the following:

2.18 Port Policing Configuration Command

This command lets you decide whether or not incoming traffic is GCRA policed on a given port. Enter the following parameters:

```
myswitch::configuration port> policing <port> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which GCRA traffic policing is to be enabled or disabled.
enable disable	enable means that GCRA traffic policing will take place on all incoming traffic on this port (depending on what has been configured using conf port gcrapolicing and using the noGCRA option in the conf upc new command). disable means that traffic policing will not take place on incoming traffic on this port (depending on what has been configured using conf port gcrapolicing and using the noGCRA option in the conf upc new command). The default is enable on all network modules, except on FramePlus network modules and on NNI links. Policing should not be enabled on NNI links when using hierarchical PNNI because cells could be dropped from the SVCC RCCs.



To enable or disable GCRA policing on incoming traffic on a per-port or on a per-class basis, it is recommended that you use the conf port gcrapolicing command instead of this command. To enable or disable GCRA policing on incoming traffic on a per-PVC basis for CBR and VBR connections, use the nogCRA option in the conf upc new command.

If you change the policing settings using this command, the switch issues a warning as shown in the following example:

```
myswitch::configuration port> policing 1b1 disable
This change will cause the GCRA policing state of all
connections on port 1b1, to be updated to allOff.
Are you sure you want to make this change? [n]?
```

2.19 Partial Packet Policing Command

When partial packet policing is enabled on a connection, the GCRA policer looks for AAL5 packet boundaries by checking for cells with an EOM indicator in their cell header. If the policer decides that a cell in the middle of the AAL5 packet is non-conforming, then all remaining cells in that AAL5 packet (up to, but not including the EOM cell) are considered non-conforming. This command lets you configure partial packet policing on a per-port/per-class basis for all CBR and/or VBR PVCs and/or SVCs. Enter the following parameters:



GCRA policing must be used on any connection on which partial packet policing is being implemented.

This command applies only to AAL5 connections. This command does not apply to the *FramePlus* network modules.

The HDCOMP ASIC must be version 1 or greater to support AAL5 partial packet policing. To display the ASIC version, use the display hdcomp command.

myswitch::configuration port> pppolicing <port> (cbr|vbr) (allon|alloff|svcOn|svcOff)

These parameters are defined as follows:

Parameter	Description
port	The port number on which partial packet policing is being configured.
cbr vbr	The class of service for which you are configuring partial packet policing.
allOn	allon means all connections (SVCs and PVCs) of the specified class of service on this port are subjected to partial packet policing.
allOff	allOff means no connections (SVCs and PVCs) of the specified class of service on this port are subjected to partial packet policing.
svcOn	svcOn means all SVCs of the specified class of service on this port are subjected to partial packet policing. PVCs are policed based on their UPC contract. This is the default.
svcOff	svcOff means no SVCs of the specified class of service on this port are subjected to partial packet policing. PVCs are policed based on their UPC contract.

For example, to enable partial packet policing on all VBR SVCs on port 2B4, enter the following parameters:

 $\verb|myswitch|::configuration| port>| \verb|pppolicing| 2b4| \verb|vbr|| svcOn|$

2.20 Showing the Port Configuration

This command lets you display general information about the ports on an individual switch fabric. To show general information about all of the ports, enter the following:

```
        myswitch::configuration port> show

        Port
        Carrier
        Admin
        Mbps
        ATM-Rate
        CDVT
        Policing
        VBROB
        BuffOB
        AIS/RDI
        Model

        1D1
        yes
        up
        155.0
        149.76
        250
        enabled
        100
        100
        disabled
        0C3

        1D2
        yes
        up
        155.0
        149.76
        250
        enabled
        100
        100
        disabled
        0C3

        1D3
        no
        up
        155.0
        149.76
        250
        enabled
        100
        100
        disabled
        0C3

        1D4
        no
        up
        155.0
        149.76
        250
        enabled
        100
        100
        disabled
        0C3

        1CTL
        yes
        up
        80.0
        79.9961
        500
        enabled
        N/A
        N/A
        disabled
        ASX-CTL

Note: ATM/OAM processing is disabled
```

Field	Description		
Port	The port numbers of each network module currently installed in the switch fabric. The control port on an ASX-4000 is displayed as 5CTL since it does not belong to a specific fabric.		
Carrier	yes means a carrier has been detected on this port. no means a carrier has not been detected A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency		
Admin	The current state of this port. Can be up (on-line) or down (off-line).		
Mbps	The capacity of this port's link in Mbps		
ATM-Rate	The actual ATM cell rate of this port in Mbps.		
CDVT	The default value for the cell delay variation tolerance setting in microseconds.		
Policing	Shows whether traffic policing is enabled or disabled for this port.		
VBROB	The bandwidth overbooking level configured on this port, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.		
BuffOB	The buffer overbooking level configured on this port, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.		
AIS/RDI	enabled means that OAM cells are generated when AISs and RDIs are detected. This setting is overridden if the ATM/OAM processing is disabled message is shown at the bottom of the display. disabled means that OAM cells are not generated when AISs and RDIs are detected.		
Model	The type of network module. For the control port, displays ASX-CTL.		
ATM/OAM processing is disabled	Shows that OAM cell generation is disabled on all ports on this switch board, despite the conf port aisrdi settings. To return all ports on this board to their last port settings shown in the AIS/RDI field, use the conf switch oam enable command. See Section 13.9 in this manual for more information.		

To list port information for just a specified port, (for example, port 1B1), enter the following parameters:

```
myswitch::configuration port> show 1d1

Port Carrier Admin Mbps ATM-Rate CDVT Policing VBROB BuffOB AIS/RDI Model

1D1 yes up 155.0 149.76 250 enabled 100 100 disabled OC3

Note: ATM/OAM processing is disabled
```

The fields in this display are defined in the same manner as those in the previous example.

This command also lets you display advanced information about all of the ports. Enter the following parameters:

myswitch::configuration port> show [<port>] [advanced tm]</port>					
myswit	ch::configu	ration por	t> show adv	ranced	
	Input		Output		
Port	CDV	maxCTD	CDV	maxCTD	hysteresis
1D1	1	21	computed	computed	500
1D2	1	21	computed	computed	500
1D3	1	21	computed	computed	200
1D4	1	21	computed	computed	500
1CTL	1	21	computed	computed	N/A

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric. The control port on an <i>ASX</i> -4000 is displayed as 5CTL since it does not belong to a specific fabric.
Input CDV	The Cell Delay Variation on the input side of this port, in microseconds.
Input maxCTD	The Cell Transfer Delay on the input side of this port, in microseconds.
Output CDV	The Cell Delay Variation on the output side of this port, in microseconds. computed means that the switch has automatically determined this value.
Output maxCTD	The Cell Transfer Delay on the output side of this port, in microseconds. computed means that the switch has automatically determined this value.
Hysteresis	The hysteresis value on this port, in milliseconds. This value indicates how soon the switch will clear a call upon detection of a remote failure. 500 is the default value. N/A displays for the control port since it can not be configured with a hysteresis value.

This command also lets you display port traffic management information. Enter the following:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
CAC	enabled means CAC is active on this port (the default state). disabled means CAC is not active on this port.
GCRA Policing CBR	allon means all CBR connections arriving on this port are subjected to GCRA policing. alloff means no CBR connections arriving on this port are subjected to GCRA policing. svcon means all CBR SVCs arriving on this port are subjected to GCRA policing. svcoff means no CBR SVCs arriving on this port are subjected to GCRA policing. CBR PVCs are policed based on the state of their UPC contract. default means all CBR SVC/SVP UNI connections arriving on this port are subjected to GCRA policing, but no CBR SVC/SVP NNI connections are subjected to GCRA policing. CBR PVCs and PVPs are policed based on the state of their UPC contract.
GCRA Policing VBR	allon means all VBR connections arriving on this port are subjected to GCRA policing. alloff means no VBR connections arriving on this port are subjected to GCRA policing. svcon means all VBR SVCs arriving on this port are subjected to GCRA policing. svcoff means no VBR SVCs arriving on this port are subjected to GCRA policing. VBR PVCs are policed based on the state of their UPC contract. default means all VBR SVC/SVP UNI connections arriving on this port are subjected to GCRA policing, but no VBR SVC/SVP NNI connections are subjected to GCRA policing. VBR PVCs and PVPs are policed based on the state of their UPC contract.
AAL5 PP Pol. CBR	allon means all AAL5 CBR connections are subjected to partial packet policing. alloff means no AAL5 CBR connections are subjected to partial packet policing. svcOn means all AAL5 CBR SVCs are subjected to partial packet policing. For AAL5 CBR PVCs, partial packet policing is performed based on the UPC contract of the connection. svcOff means no AAL5 CBR SVCs are subjected to partial packet policing. For AAL5 CBR PVCs, partial packet policing is enabled based on the UPC contract of the connection.

Field	Description
AAL5 PP Pol. VBR	allon means all AAL5 VBR connections are subjected to partial packet policing. alloff means no AAL5 VBR connections are subjected to partial packet policing. svcon means all AAL5 VBR SVCs are subjected to partial packet policing. For AAL5 VBR PVCs, partial packet policing is performed based on the UPC contract of the connection. svcoff means no AAL5 VBR SVCs are are subjected to partial packet policing. For AAL5 VBR PVCs, partial packet policing is enabled based on the UPC contract of the connection.
AAL5 Packet Discard CBR	allon means all AAL5 CBR connections are subjected to packet discard. alloff means no AAL5 CBR connections are subjected to packet discard. svcon means all AAL5 CBR SVCs are subjected to packet discard. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. svcoff means no AAL5 CBR SVCs are subjected to packet discard. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
AAL5 Packet Discard VBR	allon means all AAL5 VBR connections are subjected to packet discard. alloff means no AAL5 VBR connections are subjected to packet discard. svcon means all AAL5 VBR SVCs are subjected to packet discard. For VBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. svcoff means no AAL5 VBR SVCs are subjected to packet discard. For VBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
AAL5 Packet Discard UBR	allon means all AAL5 UBR connections are subjected to packet discard. alloff means no AAL5 UBR connections are subjected to packet discard. svcon means all AAL5 UBR SVCs are subjected to packet discard. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. svcoff means no AAL5 UBR SVCs are subjected to packet discard. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
Tag All UBR	allon means all UBR connections are tagged as non-compliant (set to CLP=1). alloff means no UBR connections are tagged. svcon means all UBR SVCs are tagged. UBR PVCs are tagged based on their UPC contract. svcoff means no UBR SVCs are tagged. UBR PVCs are tagged based on their UPC contract.

2.21 SONET Port Configuration Commands

These commands allow you to modify various aspects of the configuration of all of the ports on a SONET network module. The following SONET commands are available only when a SONET network module is installed in the switch fabric. You can display the list of available subcommands by typing sonet? at the port level.



All 155 Mbps and 622 Mbps network modules use this same set of commands, regardless of whether they are singlemode, multimode, OC-3, OC-12, or UTP network modules.

```
myswitch::configuration port> sonet ?
  emptycells loopback mode scrambling
  show timing
```

2.21.1 Configuring SONET Port Empty Cells

Empty cells are cells that are sent as "filler" or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a SONET network module port. Enter the following parameters:

```
myswitch::configuration port sonet> emptycells <port> (idle | unassigned)
```

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle unassigned ¹	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is unassigned.

^{1.} Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

2.21.2 Configuring SONET Port Loopback

This command enables you to configure the type of loopback mode on a SONET port. Enter the following parameters:

```
myswitch::configuration port sonet> loopback <port> (line | diag | path | both | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line	line connects the transmitter to the receiver. The data stream received from the fiber is retransmitted out to the fiber. In line loopback, the port acts as if it were an optical repeater. Cells that are switched to this port are not sent over the fiber. This option is valid for all SONET network modules. This option is not supported for Series 1 OC-48c port cards on an <i>ASX</i> -4000.
diag	diagnostic connects the receiver to the transmitter. The SONET stream transmitted by the fiber to a port is looped back to the fiber. The stream is still transmitted over the fiber, but the incoming stream is ignored. This option is valid for all SONET network modules, except for Series C OC-12 network modules.
path	path means that the loopback point is between the TPOP and RPOP blocks and the transmit parallel stream is connected to the receive stream. This option is valid only for Series C OC-12 network modules.
both	both lets you perform both diagnostic and line loopback on a particular port. This option is valid only for Series 1 OC-48c port cards on an <i>ASX</i> -4000.
none	none means no loopback will take place on this port. The default is none.

The following error occurs if you attempt to use line loopback on a Series 1 OC-48 port card on an *ASX*-4000:

```
myswitch::configuration port sonet> loopback 3b1 line
?ERROR: (nmod4) Invalid Configuration for this network module:
oc48_lf_setLoopbackConfig: PC-1-OC48c/STM16c-SMLR-SC-TIMING-2PT port 3B1:
loopback setting "line loopback" is not supported
```

If you want to use line loopback on a Series 1 OC-48 port card on an *ASX*-4000, you can use the **both** option, which applies both line and diagnostic loopback to the port.

2.21.3 Configuring SONET Port Mode

This command lets you designate the mode to be used on a SONET network module port. Enter the following parameters:

```
myswitch::configuration port sonet> mode <port> (sonet|sdh)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the mode is to be changed.
sonet sdh	The mode of operation for this port. Can be sonet or sdh.

2.21.4 Configuring the SONET Port Scrambling

This command allows you to change the scrambling mode on a port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> scrambling <port> (on | off)
```

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on off ¹	on indicates that cell payload scrambling is enabled on this port. off means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is on.

^{1.} The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

2.21.5 Showing the SONET Port Configuration

This command lets you display information about the configuration of all of the ports on a SONET network module. Enter the following parameters:

myswitch::configuration port sonet> show Port Width Line Mode Loopback Timing Scrambling EmptyCells 1C1 sts3c MM sonet none internal on unassigned 1C2 sts3c MM sonet none internal on unassigned 1C3 sts3c MM sonet none unassigned internal on 1C4 sts3c MM sonet none unassigned internal on N/A 1D1 sts12c MM sonet none unassigned on

Field	Description
Port	The port numbers of each SONET network module currently installed in the switch fabric.
Width	The type of the SONET path. sts3c is 155.52 Mbps and sts12c is 622.08 Mbps. The SDH transmission rate STM-1 is equivalent to SONET rate STS-3 and STM-4 is equivalent to STS-12. This is a read-only field.
Line	The line type for this interface. The line type for optical SONET signals may be SMSR (155 Mbps single-mode short reach), SMIR (622 Mbps single-mode intermediate reach), other (155 Mbps single-mode long reach), or MM (155 Mbps or 622 Mbps multi-mode) fiber. For electrical interfaces, the line type is UTP (155 Mbps Unshielded Twisted Pair).
Mode	The mode of operation for this port. Can be sonet or sdh.
Loopback	The loopback mode on the port. Can be one of the following: line, diagnostic, path, or none.
Timing ¹	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.
Scrambling	on means that payload scrambling is enabled on this port. off means that payload scrambling is disabled on this port.
EmptyCells ²	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit=1 and unassigned cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

 $^{^{1.}}$ The timing option displays N/A on all OC-12 network modules because they always use internal timing.

^{2.} Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

Port Configuration Commands

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port sonet> show 4c1
Port Width Line Mode Loopback Timing Scrambling EmptyCells
4C1 sts3c MM sonet none internal on unassigned
```

The fields in this display are defined in the same manner as those in the previous example.

This command also lets you display information about the section, line, path, and ATM status of all of the ports on the SONET network modules. Enter the following parameters:

```
        myswitch::configuration port somet>
        show status

        Port Carrier
        Section Line Path Atm

        4C1 yes
        0x1 0x1 0x1 0x1

        4C2 no
        0x6 0x2 0xc 0x2

        4C3 no
        0x6 0x2 0xc 0x2

        4C4 no
        0x6 0x2 0xc 0x2
```

Field	Description	
Port	The port numbers of each SONET network module currently installed in the switch fabric.	
Carrier	yes means a carrier has been detected on this port. no means a carrier has not been detected. A carrier is detected when a signal is applied to the receive side of the port. I does not guarantee that the signal is the proper frequency	
Section	The Section Status of this interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are as follows: 1 - sonetSectionNoDefect 2 - sonetSectionLOS - Loss Of Signal was detected. LOS is declared when 20 +/- 3us of all zero patterns is detected.	
	4 - sonetSectionLOF - Loss Of Frame was detected. LOF is declared when an out-of-frame condition persists for 3ms.	
Line	The Line Status of this interface. It is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are:	
	1 - sonetLineNoDefect	
	2 - sonetLineAIS - Line Alarm Indication Signal was detected. Line AIS is asserted when a 111 binary pattern is detected in bits 6, 7, 8 of the K2 byte for five consecutive frames.	
	4 - sonetLineRDI Line Remote Defect Indication was detected. RDI is asserted when a 110 binary pattern is detected in bits 6, 7, 8 of the K2 byte for five consecutive frames.	

Field	Description
Path	Shows the Path Status of this interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are as follows:
	1 - sonetPathNoDefect2 - sonetPathLOP - Path Loss Of Pointer was detected. Path LOP is declared when a "normal pointer value" is not found for eight consecutive frames.
	4 - sonetPathAIS - Path Alarm Indication Signal was detected. Path AIS is asserted when an all ones pattern is detected in the pointer bytes (H1 and H2) for three consecutive frames.
	8 - sonetPathRDI - Path RDI alarm has been detected. RDI alarm is declared when bit 5 of the path status byte is high for ten consecutive frames.
	16 - sonetPathUnequiped - Path is not provisioned (idle). PathSignalLabel = hex 00.
	32 - sonetPathSignalLabelMismatch - A received Path Signal Label mismatch. A received Signal Label is considered mismatched if it does not equal either the standard value for an ATM payload (hex13) or the value for an "equipped non-specific" payload (1 hex).
Atm	The ATM Status of the interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions areas follows: 1 - sonetAtmNoDefect
	2 - sonetAtmLCD - Loss of Cell Delineation was detected. LCD is declared when a "normal pointer value" is not found for eight consecutive frames.

You can also display information about the status of an individual port on a SONET network module. Enter the following parameters:

The fields in this display are defined in the same manner as those in the previous example.

2.21.6 Configuring SONET Port Timing

This command lets you change the timing source on a port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> timing <port> (network | internal)
```

Parameter	Description
port	The port number on which the line length is to be changed.
network internal	The transmit clock for this port. network means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. internal means that the internal clock is used to drive the transmit line of this port.

2.22 TAXI Port Configuration Commands

These commands let you modify the configuration of the ports on a TAXI network module. The following commands are available only when a TAXI network module is installed in the switch fabric. To list the available subcommands, type taxi? at the port level.

```
myswitch::configuration port> taxi ?
loopback show
```

2.22.1 Configuring TAXI Port Loopback

This command allows you to designate the type of loopback on a port on a TAXI network module. Enter the following parameters:

```
myswitch::configuration port taxi> loopback <port> (diag | none)
```

Parameter	Description
port	The port on which the loopback mode is to be changed.
diag	diagnostic loopback connects the receiver to the transmitter. The TAXI stream transmitted by the switch to a port is looped back to the switch. The TAXI stream is still transmitted to the network, but the incoming TAXI stream is ignored.
none	none designates that no loopback will take place on this port. This is the default setting.

2.22.2 Showing the TAXI Port Configuration

This command enables you to display current information about all of the ports on a TAXI network module. Enter the following parameters:

myswitch::	configuration	on port tax:	i> show
Port	Carrier	State	Loopback
2A1	yes	up	none
2A2	no	down	none
2A3	no	down	none
2A4	no	down	none
2A5	no	down	none
2A6	no	down	none

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected.
State	The current state of this port. Can be up (on-line) or down (off-line).
Loopback	The loopback mode of this port. Can be either none or diagnostic.

^{1.} A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port taxi> show [<port>]
myswitch::configuration port taxi> show 2a1
Port Carrier State Loopback
2A1 yes up none
```

The fields in this display are defined in the same manner as those in the previous example.

2.23 TP25 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on a TP25 network module. The following tp25 commands are available only when a TP25 network module is installed in the switch fabric. You can display the list of available subcommands by typing tp25 ? at the port level.

```
myswitch::configuration port> tp25 ?
  loopback show
```

2.23.1 Configuring the TP25 Port Loopback

This subcommand allows you to designate the type of loopback on a port on a TP25 network module. Enter the following parameters:

```
myswitch::configuration port tp25> loopback <port> (line | diag | none)
```

Parameter	Description
port	The port on which the loopback mode is to be changed.
line	line loopback, also known as remote loopback, causes received data to be transferred to the upstream system as well as to be looped back to the transmitter on this port.
diag	diagnostic loopback connects the receiver to the transmitter. The stream transmitted by the switch to a port is looped back to the switch. The stream is still transmitted to the network, but the incoming stream is ignored.
none	none designates that no loopback will take place on this port. This is the default setting.

2.23.2 Showing the TP25 Port Configuration

This command allows you to display current information about a TP25 network module. Enter the following parameters:

```
myswitch::configuration port tp25> show
Port Carrier Media Loopback RxTiming
1B1 yes
          UTP
              none
                       Yes
1B2 yes
         UTP none
                      Yes
1B3 no
          UTP none
                      Yes
          UTP none
                     Yes
1B4 yes
1B5 no
          UTP none
                       Yes
1B6 yes
          UTP none
                       Yes
```

The fields in this display are defined as follows:

Field	Description
Port	The TP25 port number of the network module(s) currently installed in the switch.
Carrier ¹	yes means a carrier has been detected on this port. no means a carrier has not been detected on this port.
Media	The kind of physical medium connected to the TP25 interface. UTP means that it is Unshielded Twisted Pair.
Loopback	The loopback mode on the port. Can be either line or none.
RxTiming	Indicates whether or not the port is receiving an 8kHz timing sync marker. These markers can be used to derive an 8kHz signal that can be transmitted from all ports on the network module and back to the switch fabric (on switches that support timing features). No means the port is not receiving sync pulses. Yes means the port is receiving sync pulses.

^{1.} A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port tp25> show [<port>]
myswitch::configuration port tp25> show 1b2
Port Carrier Media Loopback RxTiming
1B2 yes UTP none Yes
```

The fields in this display are defined in the same manner as those in the previous example.

2.24 Port Traffic Configuration Commands

These commands enable you to configure various traffic management features on an individual port on a network module on the switch. You can display the list of available subcommands by typing? at the traffic level.

The following is displayed on an LE 155, LE 25, or an ESX-3000:

```
myswitch::configuration port traffic> ?
le>
```

The following is displayed on an ASX-4000:

```
myswitch::configuration port traffic> ?
  pcl>
```

2.24.1 Configuring Port Traffic on Series C Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series C network module on the switch. You can display the list of available subcommands by typing ? at the $\mathfrak c$ level.

2.24.1.1 Configuring Cell Delay Variation on a Series C Network Module

On a Series C network module, there are two output queues that are 256 cells deep, by default, one for Constant Bit Rate (CBR) and one for Variable Bit Rate (VBR). The Cell Delay Variation (CDV) for CBR is calculated as the CBR cell queue depth (256 cells by default) multiplied by 1 cell time. The CDV for VBR is calculated as the VBR cell queue depth (256 cells by default) multiplied by 1 cell time plus the CBR CDV. The CDV also varies depending on the physical interface on which the link is running (e.g., a 155 Mbps connection versus a 45 Mbps connection). This command lets you set the maximum CDV on a worst case basis that cells for a specified output port and priority (CBR or VBR) should incur. This number is used to determine the size of the buffers reserved for CBR and VBR traffic. Enter the following parameters:

myswitch::configuration port traffic c> cdv <port> (CBR | VBR) <CDV in microseconds>

These parameters are defined as follows:

Parameter	Description
port	The port on which the CDV is to be set.
CBR VBR	Specifies if the CDV is for output CBR traffic or for output VBR traffic.
CDV ¹	In microseconds, the cell delay variation that an output cell experiences under the worst conditions.

^{1.} The network module must be reset for this command to take effect.

2.24.1.2 Setting the CLP Threshold on a Series C Network Module

This command allows you to designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series C network module. Enter the following parameters:

myswitch::configuration port traffic c> clp1 <port> (CBR | VBR | ABR) <number of cells>

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR VBR ABR ¹	Specifies for which type of traffic (CBR, VBR, or ABR/UBR) the CLP threshold is being set.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

^{1.} The Series C network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.1.3 Configuring EFCI on a Series C Network Module

This command allows you to designate the cell buffer threshold over which Unspecified Bit Rate (UBR) and Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set on a Series C network module. When the EFCI code point is set, this signals congestion to downstream switch fabrics and flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties. Enter the following parameters:

myswitch::configuration port traffic c> efci <port> (on | off) <threshold>

These parameters are defined as follows:

Parameter	Description
port	The port on which the EFCI threshold is to be set.
on off	on means the EFCI is set when the threshold number is reached, signalling congestion. off means the EFCI is cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the UBR and ABR cells will have EFCI set. The default is 64 cells.

2.24.1.4 Configuring Port Queue Size on a Series C Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series C network module. Enter the following parameters:

myswitch::configuration port traffic c> qsize <port> (CBR | VBR | ABR) <number of cells>

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR VBR ABR ¹	Specifies for which type of traffic (CBR, VBR, or ABR/UBR) to set the minimum queue size.
number of cells ²	The queue size to be assigned to the traffic designated in the previous parameter. The default is 256 cells.

^{1.} The Series C network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

^{2.} The network module must be reset for this command to take effect.

2.24.1.5 Displaying Port Traffic on a Series C Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series C network modules. Enter the following:

$\verb myswitch::configuration \\$		port	traffic	c> show	
	CLP	EFCI	EFCI		
Prio	Thrsh	On	Off	QSize	CDV
ABR-UBR	256	64	1	256	N/A
VBR	256	N/A	N/A	256	1449
CBR	256	N/A	N/A	256	724
ABR-UBR	256	64	1	256	N/A
VBR	256	N/A	N/A	256	1449
CBR	256	N/A	N/A	256	724
ABR-UBR	256	64	1	256	N/A
VBR	256	N/A	N/A	256	1449
CBR	256	N/A	N/A	256	724
ABR-UBR	256	64	1	256	N/A
VBR	256	N/A	N/A	256	1449
CBR	256	N/A	N/A	256	724
	Prio ABR-UBR VBR CBR ABR-UBR CBR ABR-UBR VBR CCBR ABR-UBR VBR CBR ABR-UBR	CLP Prio Thrsh ABR-UBR 256 VBR 256 CBR 256 ABR-UBR 256 CBR 256 CBR 256 CBR 256 ABR-UBR 256 CBR 256 ABR-UBR 256 VBR 256 CBR 256 VBR 256 CBR 256 CBR 256 CBR 256 ABR-UBR 256 CBR 256	CLP EFCI Prio Thrsh On ABR-UBR 256 64 VBR 256 N/A CBR 256 N/A ABR-UBR 256 64 VBR 256 N/A CBR 256 N/A CBR 256 N/A CBR 256 N/A ABR-UBR 256 64 VBR 256 N/A CBR 256 N/A	CLP EFCI EFCI Prio Thrsh On Off ABR-UBR 256 64 1 VBR 256 N/A N/A CBR 256 N/A N/A ABR-UBR 256 64 1 VBR 256 N/A N/A ABR-UBR 256 64 1 VBR 256 N/A N/A CBR 256 N/A N/A ABR-UBR 256 64 1 VBR 256 N/A N/A ABR-UBR 256 N/A N/A	Prio Thrsh On Off QSize ABR-UBR 256 64 1 256 VBR 256 N/A N/A 256 CBR 256 N/A N/A 256 ABR-UBR 256 64 1 256 VBR 256 N/A N/A 256 ABR-UBR 256 64 1 256 VBR 256 N/A N/A 256 CBR 256 N/A N/A 256 ABR-UBR 256 64 1 256 VBR 256 N/A N/A 256 VBR 256 N/A N/A 256

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series C network module installed in the switch fabric.
Prio ¹	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
EFCI On	The value at which the EFCI is set (turned on) when the threshold number is reached, signalling congestion, for this port and priority.
EFCI Off	The value at which the EFCI is cleared (turned off) when the threshold number is reached, indicating no congestion, for port and priority.
Qsize	The reserved queue size for this port and priority.
CDV	The maximum cell delay variation for this port and priority, specified in microseconds.

^{1.} The Series C network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

This command also lets you display port and priority traffic information for an individual port on a Series C network module. Enter the following parameters:

n	nyswito	ch::confi	guration	port	traffic>	show [<pc< th=""><th>rt>]</th></pc<>	rt>]
n	nyswito	ch::confi	guration	port	traffic>	show 1A3	
			CLP	EFCI	EFCI		
	Port	Prio	Thrsh	On	Off	QSize	CDV
	1A3	ABR-UBR	55	64	1	55	N/A
	1A3	VBR	55	N/A	N/A	55	4
	1A3	CBR	55	N/A	N/A	55	2

The fields in this display are defined in the same manner as those in the previous example.

2.24.2 Configuring Port Traffic on Series LC Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series LC network module on the switch. You can display the list of available subcommands by typing ? at the lc level.

2.24.2.1 Setting the CLP Threshold on a Series LC Network Module

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series LC network module. Enter the following parameters:

```
myswitch::config port traffic lc> clp1 <port> (CBR | VBR | ABR | UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR VBR ABR ¹ UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

^{1.} The Series LC network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.2.2 Configuring Port Queue Size on a Series LC Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series LC network module. Enter the following parameters:

myswitch::config port traffic lc> qsize <port> (CBR | VBR | ABR | UBR) <number of cells>

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR VBR ABR ¹ UBR	Specifies for which traffic type (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells ²	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

^{1.} The Series LC network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.2.3 Displaying Port Traffic on a Series LC Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series LC network modules. Enter the following:

myswitch::co	nfigura	tion port	traffic	lc> show
	CLP			
Port Prio	Thrsh	QSize		
1D1 ABR	256	256		
1D1 VBR	256	256		
1D1 CBR	256	256		
1D1 UBR	256	256		
1D2 ABR	256	256		
1D2 VBR	256	256		
1D2 CBR	256	256		
1D2 UBR	256	256		
1D3 ABR	256	256		
1D3 VBR	256	256		
1D3 CBR	256	256		
1D3 UBR	256	256		
1D4 ABR	256	256		
1D4 VBR	256	256		
1D4 CBR	256	256		
1D4 UBR	256	256		

^{2.} The network module must be reset for this command to take effect.

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LC network module installed in the switch fabric.
Prio ¹	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

^{1.} The Series LC network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic lc> show [<port>]
myswitch::configuration port traffic lc> show 1d1
              CLP
 Port Prio Thrsh OSize
              256
 1D1
      ABR
                     256
      VBR
              256
                     256
 1D1
 1D1
      CBR
              256
                    256
 1D1
      UBR
              256
                     256
```

The fields in this display are defined in the same manner as those listed above. If there are no Series LC network modules in the fabric, then the following is displayed:

```
myswitch::configuration port traffic lc> show
No Series-LC port traffic configuration information available
```

2.24.3 Configuring Port Traffic on Series LE Network Modules

On an LE 155 or LE 25, these commands enable you to configure various traffic management features on an individual port on a Series LE network module. On an *ESX*-3000, each ATM port card contains four logical network modules (interface groups). These commands let you configure or display information about the traffic on the *ESX*-3000 ATM port cards. You can display the list of available subcommands by typing ? at the le level.

```
myswitch::configuration port traffic le> ?
```



The conf port traffic le commands are only valid on an LE 155, an LE 25, or an ESX-3000 switch.

2.24.3.1 Setting the CLP Threshold on a Series LE Network Module

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series LE network module or a logical network module on an ATM port card. Enter the following parameters:

```
myswitch::config port traffic le> clp1 <port> (CBR | VBR | ABR | UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR VBR ABR ¹ UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

^{1.} The Series LE network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.3.2 Configuring Port Queue Size on a Series LE Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series LE network module or a logical network module on an ATM port card. Enter the following parameters:

```
myswitch::configuration port traffic le> qsize <port> (CBR | VBR | ABR | UBR)
<number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR VBR ABR ¹ UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells ²	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

^{1.} The Series LE network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.3.3 Displaying Port Traffic on a Series LE Network Module

This command lets you display port and priority traffic information for all of the ports on the Series LE network modules or the logical network modules on an ATM port card. The following is displayed on an LE 155 or on an *ESX*-3000:

myswit	ch::cor	nfigura	tion port	traffic	le>	show
		CLP				
Port	Prio	Thrsh	QSize			
1A1	ABR	256	256			
1A1	VBR	256	256			
1A1	CBR	256	256			
1A1	UBR	256	256			
1A2	ABR	256	256			
1A2	VBR	256	256			
1A2	CBR	256	256			
1A2	UBR	256	256			
1A3	ABR	256	256			
1A3	VBR	256	256			
1A3	CBR	256	256			
1A3	UBR	256	256			
1A4	ABR	256	256			
1A4	VBR	256	256			
Press	return	for mo	re, q to d	quit: q		

^{2.} The network module must be reset for this command to take effect.

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LE network module installed in the switch fabric.
Prio ¹	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

^{1.} The Series LE network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic le> show [<port>]
myswitch::configuration port traffic le> show lal
               CLP
Port Prio
            Thrsh OSize
 1A1
       ABR
               256
                      256
1A1
       VBR
               256
                      256
1A1
       CBR
               256
                      256
1A1
       UBR
                      256
               256
```

The fields in this display are defined in the same manner as those listed above.

Port Configuration Commands

The following is displayed on an LE 25. In this example, the VBR traffic on module 1A has been placed in the high priority queue using conf module traffic le vbrqueue <module>rt. The VBR traffic on module 1B is in the low priority queue.

		CLP	
Port	Priority	Thrsh	QSize
1A1	CBR-VBR	256	256
1A1	ABR-UBR	256	256
1A2	CBR-VBR	256	256
1A2	ABR-UBR	256	256
1A3	CBR-VBR	256	256
1A3	ABR-UBR	256	256
1A4	CBR-VBR	256	256
1A4	ABR-UBR	256	256
1B1	CBR	256	256
1B1	VBR-ABR-UBR	256	256
1B2	CBR	256	256
1B2	VBR-ABR-UBR	256	256
1B3	CBR	256	256
1B3	VBR-ABR-UBR	256	256
1B4	CBR	256	256
1B4	VBR-ABR-UBR	256	256

Press return for more, q to quit: q

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LE network module installed in the switch fabric.
Priority ¹	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

^{1.} The Series LE network modules offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

If there are no Series LE network modules in the switch (i.e., this is not an LE 155, an LE 25, or a *ESX*-3000 switch), then the following is displayed:

```
myswitch::configuration port traffic le> show
No Series-LE port traffic configuration information available
```

2.24.4 Configuring Port Traffic on Series 1 Port Cards

These commands enable you to configure various traffic management features on an individual port on a Series 1 port card on an *ASX*-4000 switch. You can display the list of available subcommands by typing ? at the pcl level.



These commands are not available on Series 1 OC-48 port cards.

2.24.4.1 Setting the CLP Threshold on a Series 1 Port Card

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series 1 port card. Enter the following parameters:

```
myswitch::configuration port traffic pcl> clp1 <port> (CBR | VBR | ABR | UBR)
<number of cells>
```

These parameters are defined as follows:

Parameter	Description		
port	The port on which the CLP threshold is to be set.		
CBR VBR ABR ¹ UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.		
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.		

^{1.} The Series 1 port cards offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.4.2 Configuring Port Queue Size on a Series 1 Port Card

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series 1 port card. Enter the following parameters:

```
myswitch::configuration port traffic pcl> qsize <port> (CBR | VBR | ABR | UBR)
<number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set. See the NOTE above.
CBR VBR ABR ¹ UBR	Specifies for which traffic type (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells ²	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

^{1.} The Series 1 port cards offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

2.24.4.3 Displaying Port Traffic on a Series 1 Port Card

This command lets you display port and priority traffic information for all of the ports on all of the Series 1 port cards. Enter the following:

myswit	ch::cor	nfigu	uration	port	t t	raffic	pc1>	show
				CI	ĹΡ			
Port	Priori	ity		Thrs	sh	QSize		
2A1	ABR			25	56	256		
2A1	VBR			25	56	256		
2A1	CBR			25	56	256		
2A1	UBR			25	56	256		
2A2	ABR			25	56	256		
2A2	VBR			25	56	256		
2A2	CBR			25	56	256		
2A2	UBR			25	56	256		
2A3	ABR			25	56	256		
2A3	VBR			25	56	256		
2A3	CBR			25	56	256		
2A3	UBR			25	56	256		
2A4	ABR			25	56	256		
2A4	VBR			25	56	256		
2A4	CBR			25	56	256		
2A4	UBR			25	56	256		
Press	return	for	more,	q to	qu	uit: q		

^{2.} The port card must be reset for this command to take effect.

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series 1 port card installed in the switch fabric.
Priority ¹	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

^{1.} The Series 1 port cards offer an ABR-ready ATM interface. A future ForeThought release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that ForeThought release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic pcl> show [<port>]
localhost::configuration port traffic pcl> show 2a4
                           CLP
 Port Priority
                        Thrsh OSize
 2A4
       ABR
                           256
                                  256
 2A4
       VBR
                           256
                                  256
 2A4
       CBR
                           256
                                  256
       UBR
 2A4
                           256
                                  256
```

The fields in this display are defined in the same manner as those listed above.

If there are no Series 1 port cards in the switch fabric, or if the switch is not an *ASX*-4000, then the following is displayed:

```
myswitch::configuration port traffic pcl> show
No Series-PCl port traffic configuration information available
```

2.24.5 Configuring Port Traffic on Series D Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series D network module on the switch. You can display the list of available subcommands by typing? at the d level.

2.24.5.1 Configuring Alternate CLP Threshold on a Series D Network Module

This command lets you apply the alternate per-connection CLP=1 or CLP=0+1 threshold for various classes of service. The alternate threshold is configured using the conf module traffic daltclpthresh command. This alternate threshold can then be applied per port for some, all, or none of these connections using this command. Enter the following:

```
myswitch::configuration port traffic d> altclpconfig <port> (cbr | vbr | ubr)
(allOn | allOff | svcOn | svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the alternate CLP thresholds are being applied.
cbr vbr ubr	Specifies for which type of traffic (CBR, VBR, or UBR) the alternate CLP=1 or CLP=0+1 thresholds are being applied. You cannot configure an alternate threshold for ABR.
allOn	allon means all connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP thresholds.
allOff	allOff means no connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP thresholds.
svcOn	svcOn means all SVCs of the specified class of service arriving on this port will use the alternate CLP thresholds. PVCs are based on their UPC contract flags.
svcOff	svcOff means no SVCs of the specified class of service arriving on this port will use the alternate CLP thresholds. PVCs are based on their UPC contract flags. This is the default.

2.24.5.2 Configuring the CLP Threshold on a Series D Network Module

This command lets you apply the CLP=1 and CLP=0+1 thresholds for a given traffic type on a specified port on a Series D network module. Enter the following parameters:

myswitch::configuration port traffic d> clpthresh <port> (cbr | vbr | abr | ubr)
(clp1 | clp01) <threshold>

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is being applied.
cbr vbr abr ubr	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) the CLP=1 or CLP=0+1 threshold is being applied.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for this port and class is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the clp01 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for this port and class is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the clp1 threshold.
threshold	The number of cells in the buffer at which the specified traffic type drops CLP=1 or CLP=0+1 cells. This number must be entered in multiples of 8. The maximum value is the size of cell memory. The default is 256 cells for CLP=1 cells and the size of cell memory for CLP=0+1 cells.

2.24.5.3 Configuring Port Queue Size on a Series D Network Module

This command enables you to designate the minimum dedicated queue size for a given type of traffic on a specified port on a Series D network module. Enter the following parameters:

myswitch::configur port traffic d> qsize <port> (cbr | vbr | abr | ubr) <number of cells>

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum dedicated queue size is to be set.
CBR VBR ABR UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the minimum dedicated queue size.
number of cells ¹	The queue size to be assigned to the traffic designated in the previous parameter. The default is 256 cells.

^{1.} The network module must be reset for this command to take effect.

2.24.5.4 Configuring the Rate Limit on a Series D Network Module

This command lets you limit a given port to a specified amount of bandwidth, effectively setting a new logical line rate for the port. This command allocates that bandwidth to the rate controller. To free the allocated bandwidth, the option disable should be specified instead of the number of cells. Enter the following parameters:

```
myswitch::configuration port traffic d> ratelimit <port> (<cp> | disabled)
```

These parameters are defined as follows:

Parameter	Description	
port	The port on which you want to change the rate limit.	
cps	The new cell rate for the port, in cells per second.	
disabled	Indicates you want to reset the bandwidth to the default value.	



You should not modify the rate limit to a value lower than the following values: for OC12 network modules - 15,183 cells/sec per port; for OC3 network modules - 3,796 cells/sec per port; and for DS3, E3, DS1, and E1 network modules - 1,898 cells/sec per port.

When you change the rate limit, the software will ask you if you want to update the configuration database. To abort the command, type n or press <ENTER>. If you wish to change the rate limit, enter y at the prompt as follows:

```
myswitch::configuration port traffic d> ratelimit lal 1412830

Changes to the rate limiting state of a port are stored in the configuration database and do not take effect until the network module is reset. Do you want to proceed with a change to the configuration database rate limiting entry for this port?
```

Proceed with database update [n]? y

The switch will then calculate the rate limit and give you the closest value to your requested value that it can. It then responds with the actual rate that it will give you.

```
Actual rate limit is 1412829
```

You must reset the network module for this command to take effect, so the switch will then prompt you to reset the network module. If you wish to reset the network module, enter y at the prompt as follows:

Reset the network module [n]? y

2.24.5.5 Scheduling Port Traffic on a Series D Network Module

This command lets you schedule the way that traffic is serviced on the output side of a Series D network module for SVCs and PVCs. Enter the following parameters:

```
myswitch::configuration port traffic d> scheduling <port> svc (cbr | vbr)
  (roundrobin | smoothed | guaranteed)
OR
  scheduling <port> pvc (cbr | vbr) (perupc | roundrobin | smoothed | guaranteed)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which you want to change the scheduling mode.
svc cbr	Indicates that this scheduling mode will apply to all CBR SVCs output on this port.
svc vbr	Indicates that this scheduling mode will apply to all VBR SVCs output on this port.
pvc cbr	Indicates that this scheduling mode will apply to all CBR PVCs output on this port.
pvc vbr	Indicates that this scheduling mode will apply to all VBR PVCs output on this port.
perupc	Indicates that the PVCs output on this port will use the scheduling mode configured by the UPC contract that is applied to them. The UPC contract can be configured using the -scheduling parameter under the conf upc new command. This option only applies to PVCs.
roundrobin	All service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs.
smoothed	All service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second.
guaranteed	This is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.





Multicast connections cannot be shaped using the rate controller (all multicasts use the round robin queues).

When using the Series D memory models (under conf module traffic d setmodel), models 1 and 4 limit you to a maximum of 8K connections in the rate controller; models 2 and 5 limit you to a maximum of 12K connections in the rate controller; and models 3 and 6 limit you to a maximum of 10K connections in the rate controller.

2.24.5.6 Displaying Port Traffic on a Series D Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series D network modules. Enter the following:

show	d>	raffic	port	myswitch::configuration		
		sholds	Thr	Queue		
	LP1	+1 C	CLE	Size	Class	Port
	256	00 :	15	256	ABR	1C1
	256	00 :	15	256	VBR	1C1
	256	00 :	15	256	CBR	1C1
	256	00 :	15	256	UBR	1C1

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
Class	The traffic type for this port.
Queue Size	The reserved queue size for this port and priority, in cells.
CLP0+1 Threshold	The value at which cells are dropped for this port and priority, regardless of their CLP bit.
CLP1 Threshold	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic d> show [<port>]
myswitch::configuration port traffic d> show 1c1
               Oueue Thresholds
        Class
                Size CLP0+1 CLP1
Port
1C1
          ABR
                 256 15000
                               256
1C1
          VBR
                 256 15000
                               256
1C1
          CBR
                 256 15000
                               256
1C1
          UBR
                 256
                       15000
                               256
```

The fields in this display are defined in the same manner as those listed above.

This command also lets you show advanced traffic information. Enter the following:

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
Alt. CLP Thresh Config	Specifies for which type of traffic (CBR, VBR, or UBR) the alternate CLP=1 or CLP=0+1 threshold is set. allon means all connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP threshold. alloff means no connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP threshold. svcon means all SVCs of the specified class of service arriving on this port will use the alternate threshold applied if their UPC contract specifies to do so. This is the default. svcoff means no SVCs of the specified class of service arriving on this port will use the alternate CLP threshold. All PVCs arriving on this port will use the alternate CLP threshold. All PVCs arriving on this port have the alternate threshold applied if their UPC contract specifies to do so.
RateLimit	Rate limit lets you limit a given port to a specified amount of bandwidth, effectively setting a new logical line rate for the port.
	If a number is displayed, this is the new cell rate for the port, in cells per second. If disabled is displayed, it means rate limit is not enabled on this port.

Port Configuration Commands

Additionally, you can show scheduling information. Enter the following parameters:

```
myswitch::configuration port traffic d> show scheduling

SVC Scheduling PVC Scheduling

Port CBR VBR CBR VBR

1C1 roundrobin roundrobin perupc perupc
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
SVC CBR Scheduling	Indicates that this scheduling mode will apply to all CBR SVCs output on this port.
SVC VBR Scheduling	Indicates that this scheduling mode will apply to all VBR SVCs output on this port.
PVC CBR Scheduling	Indicates that this scheduling mode will apply to all CBR PVCs output on this port.
PVC VBR Scheduling	Indicates that this scheduling mode will apply to all VBR PVCs output on this port.
perupc	Indicates that the PVCs output on this port will use the scheduling mode configured by the UPC contract that is applied to them. The UPC contract can be configured using the <code>-scheduling</code> parameter under the <code>conf upc new</code> command. This option only applies to PVCs.
roundrobin	All service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs.
smoothed	All service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second.
guaranteed	This is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.

If there are no Series D network modules in the switch fabric, then the following is displayed:

```
myswitch::configuration port traffic d> show
No Series-D port traffic configuration information available
```

2.25 UBR Tagging Command

When UBR tagging is enabled on a connection, all cells on the connection are tagged by the policer so that they can be discarded using the CLP=1 threshold when congestion is experienced. This prevents UBR traffic on a given port from using an unfair amount of buffer resources on a network module. This command lets you tag cells on a per-port and per-connection basis for all UBR connections.



This command does not apply to the *FramePlus* network modules.

Enter the following parameters:

myswitch::configuration port> ubrtagging <port> (allOn|allOff|svcOn|svcOff)

These parameters are defined as follows:

Parameter	Description
port	The port number on which UBR tagging is being configured.
allOn	allon means all UBR connections (SVCs and PVCs) arriving on this port are subjected to UBR tagging.
allOff	allOff means no UBR connections (SVCs and PVCs) arriving on this port are subjected to UBR tagging.
svcOn	svcOn means all UBR SVCs arriving on this port are subjected to UBR tagging. PVCs are tagged based on their UPC contract. This is the default.
svcOff	<pre>svcOff means no UBR SVCs arriving on this port are subjected to UBR tagging. PVCs are tagged based on their UPC contract.</pre>

For example, to enable tagging on all UBR SVCs and PVCs on port 2B4, enter the following parameters:

myswitch::configuration port> ubrtagging 2b4 allOn

2.26 VBRBuffOB Port Configuration Commands

This command is an advanced option that allows you to set an output buffer overbooking level for VBR traffic on a particular port. The overbooking factors affect the amount of bandwidth that is associated with VBR connections. When a VBR connection is created or destroyed, a quantity of bandwidth is allocated/de-allocated from the port for the connection.



It is recommended that you reset the network module after making any modification to the port overbooking factors so that VBR bandwidth is accurately accounted for by the switch control software. (See Part 1 of the AMI Configuration Commands Reference Manual for more information about conf module reset.) A change to the overbooking factors that is not followed by a reset may result in an incorrect amount of bandwidth being de-allocated for any existing VBR connections when those connections are destroyed.



This command does not apply to the *FramePlus* network modules.

Enter the following parameters to modify the overbooking factor:

myswitch::configuration port> vbrbuffob <port> <percent>

These parameters are defined as follows:

Parameter	Description
port	The port number on which the buffer overbooking level for VBR traffic is to be configured. Overbooking cannot be configured on the control (CTL) port.
percent	The buffer overbooking level assigned to this path, specified as a percentage. Enter an integer value greater than or equal to 1. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. The maximum value is 32,767.

2.27 VBROB Port Configuration Commands

This command is an advanced option that allows you to set an output bandwidth overbooking level for VBR traffic on a particular port. The overbooking factors affect the amount of bandwidth that is associated with VBR connections. When a VBR connection is created or destroyed, a quantity of bandwidth is allocated/de-allocated from the port for the connection.



It is recommended that you reset the network module after making any modification to the port overbooking factors so that VBR bandwidth is accurately accounted for by the switch control software. (See Part 1 of the AMI Configuration Commands Reference Manual for more information about conf module reset.) A change to the overbooking factors that is not followed by a reset may result in an incorrect amount of bandwidth being de-allocated for any existing VBR connections when those connections are destroyed.



This command does not apply to the *FramePlus* network modules.

Enter the following parameters to modify the overbooking factor:

myswitch::configuration port> vbrob <port> <percent>

These parameters are defined as follows:

Parameter	Description
port	The port number on which the bandwidth overbooking level for VBR traffic is to be configured. Overbooking cannot be configured on the control (CTL) port.
percent	The bandwidth overbooking level assigned to this port, specified as a percentage. Enter an integer value from 1 to 32,767. The default is 100, which indicates that no overbooking will occur. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.

Port Configuration Commands

CHAPTER 3 Port Card Command

This command lets you display information about the ATM port cards in an ESX-3000. You can display the available subcommand by typing? at the portcard level.

```
myswitch::configuration portcard> ?
  show
```



This command is only available on ESX-3000 switches.

Displaying ATM Port Card Information 3.1

This command lets you display information about all of the ATM port cards that are installed in an *ESX*-3000. Enter the following parameters:

```
myswitch::configuration portcard> show
Port Hw Mfg
Card Ver Rev S/N
                    Model
     8 9 00000048 12 ports OC-3c MMF SC series-1
 3
     0 1 00000180 16 ports 155 Mbps UTP5 series-1
             00000172    16 ports 155 Mbps UTP5 series-1
```

The fields in this display are defined as follows:

Field	Description			
Port Card	Shows the slot number in which the port card is installed in an ESX-3000 switch.			
Hw Ver	Shows the hardware configuration number of this port card.			
Mfg Rev	Shows the assembly revision number of this port card.			
S/N	Shows the serial number of this port card.			
Model	Describes what type of port card is installed. Shows the number of ports, the SONET rate, the fiber type, and the series number.			

Port Card Command

You can also display information for a specific ATM port card as follows:

```
myswitch::configuration portcard> show [<portcard>]
myswitch::configuration portcard> show 5
Port Hw Mfg
Card Ver Rev S/N Model
5 0 1 00000172 16 ports 155 Mbps UTP5 series-1
```

The fields in this display are defined in the same manner as those in the previous example. If your switch is not an *ESX*-3000, you receive the following error message:

```
myswitch::configuration portcard> show
No table information for portcard is available.
```

CHAPTER 4

Profile Configuration Commands

These commands let you delete, create, or display profiles that can be used in the definition of a number of Frame Relay and FUNI services and connections. A profile is similar to a UPC contract such that you can define a profile and then assign it to a particular connection or service during the creation of the connection or service.

For most profile types, several default profiles are provided for your convenience. Only one default is provided for the epdppd profile and the funi profile. These default profiles reflect what typical networks may need. You cannot delete the default profiles. If a service or connection is created without specifying any profile, the first default profile in the list (index 0) is used.

You can also create new profiles and delete profiles that you create, but you cannot modify existing ones. Each profile has an associated reference count, which identifies the number of services or connections that are currently using that profile. You cannot delete any profile that is currently in use (has a non-zero reference count). For more information about profiles, see Appendix D in the *ATM Switch Network Configuration Manual*. You can display the list of available subcommands by typing ? at the profile level.



These commands are only available on *FramePlus* network modules.

4.1 EPD/PPD Profile Configuration Commands

These commands let you delete, create, or display EPD/PPD profiles. These profiles let you determine how selective cell discard is performed. These profiles then can be applied on a per-VC basis to a Frame Relay PVC using the <code>-epdppd</code> <code><index></code> option under <code>conf fratm pvc new</code> or to a FUNI PVC using the <code>-epdppd</code> <code><index></code> option under <code>conf funi pvc new</code> You can display the list of available subcommands by typing ? at the <code>epdppd</code> level.

4.1.1 Deleting a EPD/PPD Profile

This command lets you delete an EPD/PPD profile. Enter the following parameters:

```
myswitch::configuration profile epdppd> delete <index>
```



You cannot delete a profile that is in use (has a non-zero value in the Ref field under conf profile epdppd show.) You cannot delete a default profile.

4.1.2 Creating a EPD/PPD Profile

This command lets you create an EPD/PPD profile. Enter the following parameters:

```
myswitch::configuration profile epdppd> new <index> [-prio (high|low)]
[-clp0epd (enabled|disabled)]
[-clp1ppd (enabled|disabled)] [-clp1epd (enabled|disabled)]
[-name <name>]
```



CLP0PPD is always enabled; therefore, it is not configurable in AMI. This means that all Frame Relay and FUNI PVCs are subjected to CLP0PPD.

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each EPD/PPD profile. The default profile's index is 0. This number must be a positive integer.
prio (high low)	The priority buffer used to handle the traffic of a connection. The default is low.
clp0epd (enabled disabled)	enabled means the designated buffer discards traffic once the specified CLP=0 threshold has been surpassed. disabled means the designated buffer does not discard traffic once the specified CLP=0 threshold has been surpassed. The high priority threshold is specified using conf module fram highthresholds and the low priority threshold is specified using conf module fram lowthresholds. The default is enabled.
clp1ppd (enabled disabled)	enabled means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. disabled means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed. The high priority threshold is specified using conf module fram highthresholds and the low priority threshold is specified using conf module fram lowthresholds. The default is enabled.
clp1epd (enabled dis- abled)	enabled means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. disabled means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed. The high priority threshold is specified using conf module fram highthresholds and the low priority threshold is specified using conf module fram lowthresholds. The default is enabled.
name <name></name>	The optional, user-defined name that uniquely identifies each EPD/PPD profile. The name of the default EPD/PPD profiles are default1 and default2.

4.1.3 Displaying EPD/PPD Profile Information

These commands let you display the information for EPD/PPD profiles. Enter the following:

```
myswitch::configuration profile epdppd> show

Index Prio Clp0epd Clp1ppd Clp1epd Ref Name
0 low enabled enabled enabled 0 default1
1 high disabled disabled disabled 0 default2
```

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given EPD/PPD profile.
Prio	The priority queue that should handle the traffic of a connection.
Clp0epd	enabled means the designated buffer discards traffic once the specified CLP=0 threshold has been surpassed. disabled means the designated buffer does not discard traffic once the specified CLP=0 threshold has been surpassed.
Clp1ppd	enabled means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. disabled means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed.
Clp1epd	enabled means the designated buffer discards traffic once the specified CLP=1 threshold has been surpassed. disabled means the designated buffer does not discard traffic once the specified CLP=1 threshold has been surpassed.
Ref	The reference count for this EPD/PPD profile. Shows how many connections are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this EPD/PPD profile.

4.2 FRF.8 Profile Configuration Commands

These commands let you delete, create, or display FRF.8 profiles to be used with Frame Relay PVCs. These profiles let you define the interworking mappings between Frame Relay and ATM. These profiles then can be applied on a per-VC basis using the <code>-frf8 <index></code> option under <code>conffratmpvc new</code>. You can display the list of available subcommands by typing? at the <code>frf8</code> level.

4.2.1 Deleting a FRF.8 Profile

This command lets you delete an FRF.8 profile. Enter the following parameters:

```
myswitch::configuration profile frf8> delete <index>
```



You cannot delete a profile that is in use (has a non-zero value in the Ref field under conf profile frf8 show) You cannot delete a default profile.

4.2.2 Creating a FRF.8 Profile

This command lets you create an FRF.8 profile. Enter the following:

```
myswitch::configuration profile frf8> new <index> [-DeToClp (mapped|ignored)]
        [-ClpValue (0|1)]
        [-ClpToDe (mapped|ignored)] [-DeValue (0|1)] [-Fecn (mapped|ignored)]
        [-protocols (all|ethernet|ethernetFcs|tokenRing|tokenRingFcs|ip|arp)]
        [-name <name>]
```

These parameters for delete and new are defined as follows:

Parameter	Description					
index	The index number that uniquely identifies each FRF.8 profile. The default profile's index is 0. This number must be a positive integer.					
DeToClp (mapped ignored)	mapped means the Discard Eligibility (DE) field in the Q922 core frame is mapped to the ATM CLP field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. When using mapped, the -clpValue option is set to N/A. ignored means the ATM CLP of every ATM cell generated by the segmentation process of the AAL5 PDU containing the information of that frame is set to a constant value specified by the -clpValue option. The default value is mapped.					
clpValue (0 1)	The CLP bit value of all generated Frame Relay frame headers if the -DeToClp option is set to ignored. The default value is N/A.					
ClpToDe (mapped ignored)	mapped means the FR/ATM service interworking function sets the DE field of the Q922 core frame, provided that one or more cells belonging to this frame has its CLP field set. When using mapped, the -deValue option is set to N/A. ignored means the DE field of the Q922 core frame is set to a constant value specified by the the -deValue option. The default value is mapped.					
deValue (0 1)	The DE bit value of all generated Frame Relay frame headers if the -ClpToDe option is set to ignored. The default value is N/A.					
Fecn (mapped ignored)	mapped means the FECN field in the Q922 core frame is mapped to the ATM EFCI field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. This mode provides congestion indication to the endpoints where higher layer protocol entities might be involved in traffic control. <code>ignored</code> means the EFCI field of cells generated by the segmentation process of the AAL5 PDU containing the information of the frame is always set to congestion-not-experienced. The default is mapped.					
protocols (all ethernet ethernetFcs tokenRing tokenRingFcs ip arp)	The possible encapsulation translation protocols that can occur over this FRF.8 IWF instance. Any combination of these protocols is supported. When specifying more than one protocol, use a period to separate them; e.g., ethernet.ip.arp. The default value is all, which is displayed as transparent.					
name <name></name>	The optional, user-defined name that uniquely identifies each FRF8 profile. The name of the default FRF8 profiles are transparent, brouter, bridgedEth, routedIP, and bridgeTok.					

4.2.3 Displaying FRF.8 Protocol Information

These commands let you display protocol information for FRF.8 profiles. Enter the following:

myswitch::configuration profile frf8> protocols
Index Protocols ProtocolString
0 0 transparent mode
1 17 ethernet. ip.
2 3 ethernet. ethernetFcs.
3 16 ip.
4 12 tokenRing. tokenRingFcs.

The fields in this display are defined as follows:

Field	Description				
Index	The index number that identifies a given FRF.8 profile.				
Protocols	A binary map number which lists all of the possible encapsulation translation protocols that can occur over this FRF.8 IWF instance. The binary values are: ethernet (000001) ethernetFcs (000010) tokenRing (000100) tokenRingFcs (001000) ipRouted (010000) arp (100000) or any combinations of the binary values. The possible range of values is from 0 to 63.				
ProtocolString	A translation of the list of protocols that is represented by the value in the Protocol field.				

4.2.4 Displaying FRF.8 Profile Information

This commands lets you display information for FRF.8 profiles. Enter the following:

			w	frf8> sh	profile	iguration	ch::conf	myswit
				->FR	ATM	>ATM	FR-	
Name	Ref	Protocols	Fecn	DeValue	ClpToDe	ClpValue	DeToClp	Index
transparent	0	transparent	mapped	N/A	mapped	N/A	mapped	0
brouter	0	17	mapped	N/A	mapped	N/A	mapped	1
bridgedEth	0	3	mapped	N/A	mapped	N/A	mapped	2
routedIP	0	16	mapped	N/A	mapped	N/A	mapped	3
bridgeTok	0	12	mapped	N/A	mapped	N/A	mapped	4

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given FRF.8 profile.
De/Clp	mapped means the DE field in the Q922 core frame is mapped to the ATM CLP filled of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. ignored means the ATM CLP of every ATM cell generated by the segmentation process of the AAL5 PDU containing the information of that frame is set to a constant value specified by the -devalue option.
Clp/De	mapped means the FR/ATM service interworking function sets the DE field of the Q922 core frame, provided that one or more cells belonging to this frame has its CLP field set. ignored means the DE field of the Q922 core frame is set to a constant value specified by the the -clpValue option.
Fecn	mapped means the FECN field in the Q922 core frame is mapped to the ATM EFCI field of every cell generated by the segmentation process of the AAL5 PDU containing the information of that frame. This mode provides congestion indication to the end-points where higher layer protocol entities might be involved in traffic control mechanisms. ignored means the EFCI field of cells generated by the segmentation process of the AAL5 PDU containing the information of the frame is always set to congestion-not-experienced.
DeValue	The DE bit value of all generated Frame Relay frame headers if the -ClpToDe option is set to ignored.
ClpValue	The CLP bit value of all generated Frame Relay frame headers if the -DeToClp option is set to ignored.
Protocols	The possible encapsulation translation protocols that can occur over this FRF.8 IWF instance.
Ref	The reference count for this FRF.8 profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this FRF.8 profile.

4.3 Frame Relay Rate Configuration Commands

These commands let you delete, create, or display Frame Relay rate profiles. These profiles allow you to manage and define rate enforcement characteristics that can be applied on a per-VC basis using the -frrate <index> option under conf fratm pvc new. You can display the list of available subcommands by typing? at the frrate level.

4.3.1 Deleting a Frame Relay Rate Profile

This command let you delete a Frame Relay rate profile. Enter the following parameters:

```
myswitch::configuration profile frrate> delete <index>
```



You cannot delete a profile that is in use (has a non-zero value in the Ref field under conf profile frrate show.) You cannot delete a default profile.

4.3.2 Creating a Frame Relay Rate Profile

This command let you create a Frame Relay rate profile. Enter the following parameters:

```
myswitch::configuration profile frrate> new <index>
    [-inBc <bits>] [-inBe <bits>] [-inCir <kbps>]
    [-outBc <bits>] [-outBc <bits>] [-outCir <kbps>] [-name <name>]
```

The acceptable combinations are as follows:

- cir+eir profile: cir > 0, bc > 0, be > 0
- cir profile: cir > 0, bc > 0, be = 0
- zero-cir profile: cir = 0, bc = 0, be > 0

Profile Configuration Commands

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each Frame Relay rate profile. The default profile's index is 0. This number must be a positive integer.
inBc	The committed burst size, in bits, in the ingress (Frame Relay to ATM) direction of a connection. The default value is 0.
inBe	The excess burst size, in bits, in the ingress (Frame Relay to ATM) direction of a connection. The default value is 64000.
inCir	The committed information rate, in kbps, in the ingress (Frame Relay to ATM) direction of a connection. The default value is 0.
outBc	The committed burst size, in bits, in the egress (ATM to Frame Relay) direction of a connection. The default value is 0.
outBe	The excess burst size, in bits, in the egress (ATM to Frame Relay) direction of a connection. The default value is 64000.
outCir	The committed information rate, in kbps, in the egress (ATM to Frame Relay) direction of a connection. The default value is 0.
name	The optional, user-defined name that uniquely identifies each Frame Relay rate profile. The name of the default Frame Relay rate profiles are default0, default1, default2, default3, and default4.

4.3.3 Displaying Frame Relay Rate Profile Information

These commands let you display Frame Relay rate profile information. Enter the following:

myswitch::configuration profile frrate> show									
Index	InBc	InBe	InCir	OutBc	OutBe	OutCir	Ref	Name	
	(bits)	(bits)	(kbps)	(bits)	(bits)	(kbps)			
0	0	64000	0	0	64000	0	0	default0	
1	64000	64000	64	64000	64000	64	0	default1	
2	64000	0	64	64000	0	64	0	default2	
3	56000	56000	56	56000	56000	56	0	default3	
4	56000	0	56	56000	0	56	0	default4	

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given Frame Relay rate profile.
InBc	The committed burst size, in bits, in the ingress (Frame Relay to ATM) direction of a connection.
InBe	The excess burst size, in bits, in the ingress (Frame Relay to ATM) direction of a connection.
InCir	The committed information rate, in kbps, in the ingress (Frame Relay to ATM) direction of a connection.
OutBc	The committed burst size, in bits, in the egress (ATM to Frame Relay) direction of a connection.
OutBe	The excess burst size, in bits, in the egress (ATM to Frame Relay) direction of a connection.
OutCir	The committed information rate, in kbps, in the egress (ATM to Frame Relay) direction of a connection.
Ref	The reference count for this Frame Relay rate profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this Frame Relay rate profile.

4.4 FUNI Configuration Commands

These commands let you delete, create, or display Frame-based UNI (FUNI) profiles. These profiles then can be applied on a per-service basis using the <code>-funi <index></code> option under <code>conf funi new</code>. To display the list of available subcommands, type ? at the <code>funi</code> level.

4.4.1 Deleting a FUNI Profile

This command let you delete a FUNI profile. Enter the following parameters:

myswitch::configuration profile funi> delete <index>



You cannot delete a profile that is in use (has a non-zero value in the Ref field under conf profile funi show.) You cannot delete a default profile.

4.4.2 Creating a FUNI Profile

This command let you create a FUNI profile. Enter the following parameters:

```
myswitch::configuration profile funi> new <index>
[-minVci <vci>] [-maxVci <vci>]
[-vpiBits <bits>] [-name <name>]
```

These parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each FUNI profile. The default profile's index is 0. This number must be a positive integer.
minVci <vci></vci>	The minimum numerical value allowed to be used as a VCI on any PVC over this FUNI service. When you create a FUNI PVC on a service that is using this profile, the VCI that you choose for $\langle fvCi \rangle$ cannot be smaller than this number. The default is 32.
maxVci <vci></vci>	The maximum numerical value allowed to be used as a VCI on any PVC over this FUNI service. When you create a FUNI PVC on a service that is using this profile, the VCI that you choose for <fvci> cannot be larger than this number. The default is 63.</fvci>
vpiBits <bits></bits>	The maximum number of VPI bits configured for use on a FUNI interface. At the ATM FUNI, this value is smaller than or equal to 4 when the FUNI header size is two bytes. The default is 0.
name <name></name>	The optional, user-defined name that uniquely identifies each FUNI profile. The name of the default FUNI profile is default.

4.4.3 Displaying FUNI Profile Information

These commands let you display FUNI profile information. Enter the following:

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given FUNI profile.
Mode	The FUNI operational mode supported by this profile. This is currently a read-only field.
Oam	on (enabled) means that OAM cells and frames are sent on this FUNI service. This is a read-only field.
vci Min	The minimum numerical value that can be used as a VCI on any PVC over this FUNI service.
vci Max	The maximum numerical value that can be used as a VCI on any PVC over this FUNI service.
#bits Vpi	The maximum number of VPI bits configured for use on this FUNI interface.
#bits Vci	The maximum number of VCI bits configured for use on this FUNI interface.
Ref	The reference count for this FUNI profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this FUNI profile.

These commands let you display advanced FUNI profile information. These are all read-only fields. Enter the following:

```
myswitch::configuration profile funi> show [<index>] advanced
myswitch::configuration profile funi> show advanced
Indx aal34  fcsBits  hdrBytes
0  disabled fcsBits16 hdrBytes2
```

The fields in this display are defined as follows:

Field	Description
Indx	The index number that identifies a given FUNI profile.
aal34	Indicates that AAL3/4 is not supported, but AAL5 is supported.
fcsBits	Indicates that a 16-bit FCS is used in each FUNI frame header over this FUNI interface.
hdrBytes	Indicates that the FUNI frame header size is 2 bytes.

4.5 LMI Configuration Commands

These commands let you delete, create, or display a Link Management Interface (LMI) profile. These profiles let you define the version of LMI that is supported by a particular Frame Relay service. These profiles then can be applied on a per-service basis using the <code>-lmi</code> <code><index></code> option under <code>conffratm</code> new. You can display the list of available subcommands by typing ? at the <code>lmi</code> level.

4.5.1 Deleting an LMI Profile

This command let you delete an LMI profile. Enter the following parameters:

```
myswitch::configuration profile lmi> delete <index>
```



You cannot delete a profile that is in use (has a non-zero value in the Ref field under conf profile lmi show) You cannot delete a default profile.

4.5.2 Creating an LMI Profile

This command let you create an LMI profile. Enter the following parameters:

```
myswitch::configuration profile lmi> new <index>
[-flavor (q933a|t1617d|none)]
[-role (user|network)] [-direction (uni|bi)]
[-t391 <sec>] [-t392 <sec>]
[-n391 <integer>] [-n392 <integer>] [-n393 <integer>]
[-name <name>]
```



If you do not want to use LMI, then you need to use the none option under -flavor and use this profile when creating your services.

The parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each LMI profile. The default profile's index is 0. This number must be a positive integer.
flavor (q933a t1617d none)	The type of LMI protocol used. none means that LMI is not used on the service. The default value is q933a.
role (user network)	The role of operation of this Frame Relay service. Can be either user (DTE) or network (DCE). The default value is network.
direction (uni bi)	uni means the signalling should be unidirectional. bi means the signalling should be bidirectional. The default value is bi.
t391 <sec></sec>	The user-side T391 link integrity verification polling timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing user-side procedures, then this value is equal to noSuchName. This value must always be less than the value of t392. The possible range is 5 - 30 seconds. The default value is 10.
t392 <sec></sec>	The network-side T392 polling verification timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to nosuchName. This value must always be greater than the value of t391. The possible range is 5 - 30 seconds. The default value is 15.
n391 <integer></integer>	The user-side N391 full status (status of all PVCs) polling cycle value for this UNI/NNI logical port. If the logical port is not performing user-side procedures, this value is equal to noSuchName. The possible range is 1 - 255. The default value is 6.
n392 <integer></integer>	The network-side N392 error threshold value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName. This value must always be less than or equal to the value of n393. The possible range is from 1 - 10. The default value is 3.
n393 <integer>¹</integer>	The network-side N393 monitored events count value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName. This value must always be greater than or equal to the value of n392. The possible range is 1 - 10. The default value is 4.
name <name></name>	The optional, user-defined name that uniquely identifies each LMI profile. The name of the default LMI profiles are qnet+user, default2, default3, default4, default5, and tnet+user.

 $^{^{1.}}$ If n393 is set to a value much less than n391, then the link could go in and out of an error condition without the user equipment or network being notified.

4.5.3 Displaying LMI Profile Information

These commands let you display LMI profile information. Enter the following:

myswite	myswitch::configuration profile lmi> show									
Index	Flavor	Role	Dtn	T391	T392	N391	N392	N393	Ref	Name
0	q933a	network	bi	10	15	6	3	4	0	qnet+user
1	q933a	network	uni	10	15	6	3	4	0	default2
2	q933a	user	uni	10	15	6	3	4	0	default3
3	t1617d	network	uni	10	15	6	3	4	0	default4
4	t1617d	user	uni	10	15	6	3	4	0	default5
5	t.1617d	network	bi	10	15	6	3	4	0	tnet+user

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given LMI profile.
Flavor	The type of LMI protocol used.
Role	The role of operation of this Frame Relay service, either user (DTE) or network (DCE).
Dtn	uni means the signalling is unidirectional. bi means the signalling is bidirectional.
T391	The user-side T391 link integrity verification polling timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing user-side procedures, then this value is equal to noSuchName.
T392	The network-side T392 polling verification timer value, in seconds, for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName.
N391	The user-side N391 full status polling cycle value for this UNI/NNI logical port. If the logical port is not performing user-side procedures, this value is equal to noSuchName.
N392	The network-side N392 error threshold value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName.
N393	The network-side N393 monitored events count value for this UNI/NNI logical port. If the logical port is not performing network-side procedures, then this value is equal to noSuchName.
Ref	The reference count for this LMI profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this LMI profile.

4.6 Generic Service Profile Configuration Commands

These commands let you delete, create, or display generic service profiles. These profiles let you define service attributes that are common to Frame Relay interworking services and FUNI services. These profiles then can be applied on a per-service basis to a Frame Relay service using the -service <index> option under conf fratm new or to a FUNI service using the -service <index> option under conf funi new. You can display the list of available subcommands by typing? at the service level.

4.6.1 Deleting a Generic Service Profile

This command let you delete a generic service profile. Enter the following parameters:

```
myswitch::configuration profile service> delete <index>
```



You cannot delete a profile that is in use (has a non-zero value in the Ref field under conf profile service show) You cannot delete a default profile.

4.6.2 Creating a Generic Service Profile

This command let you create a generic service profile. Enter the following parameters:

```
myswitch::configuration profile service> new <index> <accRate in kbps>
[-maxInfoSize <bytes>]
[-maxVccs <integer>] [-inBwOb <%>] [-outBwOb <%>] [-name <name>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
index	The index number that uniquely identifies each generic service profile. The default profile's index is 0. This number must be a positive integer.
accRate in kbps	The access rate of this service, in Kbps. The default value is 64 . If you wish to use multiple timeslots, you must modify this value accordingly. The access rate for one timeslot is 64 Kbps, and the access rate for two timeslots is 128 Kbps, etc. The access rate for 24 timeslots (max. for DS1) is 1536 Kbps and the access rate for 31 timeslots (max. for E1) is 1984 Kbps.
maxInfoSize <bytes></bytes>	The maximum payload size, in bytes, supported by this service. This value must not exceed 4092. The default value is 4092.
maxVccs <integer></integer>	The maximum number of virtual circuits supported by this service. The maximum value is 256. The default value is 5.
inBwOb <%>	The bandwidth CIR overbooking (percentage) of this Frame Relay service in the incoming direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This option does not apply to FUNI services. The default value is 100.
outBwOb <%>	The bandwidth CIR overbooking (percentage) of this Frame Relay service in the outgoing direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This option does not apply to FUNI services. The default value is 100.
name <name></name>	The optional, user-defined name that uniquely identifies each generic service profile. The name of the default generic service profiles are mini, midi, average, fullDs1, and fullE1.

4.6.3 Displaying Generic Service Profile Information

These commands let you display generic service profile information. Enter the following:

myswitch::configuration	profile	service>	show
-------------------------	---------	----------	------

Index	AccRate M	axInfoSize	MaxVccs	InBwOb	outBwOb	Ref Name
	(kbps)	(bytes)		(%)	(%)	
0	64	4092	5	100	100	124 mini
1	128	4092	10	100	100	0 midi
2	256	4092	10	100	100	0 average
3	1536	4092	256	100	100	0 fullDS1
4	1984	4092	256	100	100	0 fullE1

The fields in this display are defined as follows:

Field	Description
Index	The index number that identifies a given generic service profile.
AccRate	The access rate of this service, in Kbps.
MaxInfoSize	The maximum payload size, in bytes, supported by this service.
MaxVccs	The maximum number of virtual circuits supported by this service.
InBwOb	The bandwidth CIR overbooking (percentage) of this service in the incoming direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This field does not apply to FUNI services.
OutBwOb	The bandwidth CIR overbooking (percentage) of this service in the outgoing direction. If the percentage is greater than 100%, it is overbooking; otherwise, it is underbooking. This field does not apply to FUNI services.
Ref	The reference count for this generic service profile. Shows how many connections and/or services are using this profile. A profile cannot be deleted if it is in use.
Name	The optional, user-defined name associated with this generic service profile.

QOS Expansion Table Commands

These commands let you delete, create, or display information about Quality of Service (QOS) entries in the QOS expansion table. The QOS expansion table is used for translating the QOS class in an incoming connection setup request into parameterized QOS values for Cell Transfer Delay (CTD), Cell Delay Variation (CDV), and Cell Loss Ratio (CLR). Please refer to Section 6.5.2.3.5 of the ATM Forum PNNI Specification for more information.

Each entry in the expansion table is indexed by an index and a QOS class. The index is used for associating entries in the expansion table with signalling interfaces. The table contains 5 default entries with an index of 0. When a new signalling interface is created, an expansion table index will be associated with it. If no index is specified while creating the signalling interface, the default entries with index 0 will be used to associate this signalling interface with the QOS expansion table entries.

You can display the list of available subcommands by typing? at the **gos** level.

5.1 Deleting a QOS Expansion Table Entry

These commands let you delete an entry from the QOS expansion table. If a QOS expansion table is currently being used by one or more signalling interfaces or originating SPVCs, then the expansion entries in that table cannot be deleted. Also, the entries in the default QOS expansion table (index 0) cannot be deleted. Enter the following parameters:

myswitch::configuration qos> delete <QoSExpIndex> <QoSclass>

These parameters are defined as follows:

Parameter	Description
QosExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSclass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 through 4.

5.2 Creating a QOS Expansion Table Entry

These commands let you add an entry to the QOS expansion table. If an expansion entry is created without some of the values specified for some of the QOS classes, then it is assumed that any value is acceptable for all the parameters. If such a partially specified QOS expansion table is used to create a signalling interface or originating SPVC, then no new expansion entries can be added to this table. You will be able to add the unspecified expansion entries once all of the signalling interfaces and originating SPVCs referencing the partially specified table are deleted. Enter the following:

These parameters are defined as follows:

Parameter	Description
QosExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSclass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 to 4.
-name <name></name>	An optional text string associated with this entry to help you identify it.
-fwdCtd <ctd(us) any_value="" =""></ctd(us)>	The maximum acceptable forward CTD value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying any_value or 16777215 means that you are willing to accept any amount of cell transfer delay. The default is any_value.
-fwdCdv <cdv(us) any_value="" =""></cdv(us)>	The maximum acceptable forward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying any_value or 16777215 means that you are willing to accept any amount of cell delay variation. The default is any_value.
-backCdv <cdv(us) any_value="" =""></cdv(us)>	The maximum acceptable backward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying any_value or 16777215 means that you are willing to accept any amount of cell delay variation. The default is any_value.
-fwdClr <clr any_value=""></clr >	The maximum acceptable forward CLR value to be used for this expansion. Can range from 1 to 15. any_value means that you are specifying that you are willing to accept any amount of cell loss. A CLR value of x means that you are specifying 10^{-x} ; e.g., 5 means 10^{-5} . The default is any_value.
-backClr <clr any_value=""></clr >	The maximum acceptable backward CLR value to be used for this expansion. Can range from 1 to 15. any_value means that you are specifying that you are willing to accept any amount of cell loss. A CLR value of x means that you are specifying 10^{-x} ; e.g., 5 means 10^{-5} . The default is any_value.

5.3 Displaying the QOS Expansion Table

These commands let you display the entries in the QOS expansion table. Enter the following:

```
myswitch::configuration qos> show

QoSExp QoS

Index Class fCtd(us) fCdv(us) bCdv(us) fClr bClr Name

0     0     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     def_class_0_expn

0     1     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     def_class_1_expn

0     2     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     def_class_2_expn

0     3     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     def_class_3_expn

0     4     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     ANY_VAL     def_class_4_expn
```

The fields in this display are defined as follows:

Field	Description
QoSExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSClass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 to 4.
fCtd(us)	The maximum acceptable forward CTD value to be used for this expansion. Can range from 0 to 16777215 microseconds. any_value means that any amount of cell transfer delay is acceptable.
fCdv(us)	The maximum acceptable forward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. any_value means that any amount of cell delay variation is acceptable.
bCdv(us)	The maximum acceptable backward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. any_value means any amount of cell delay variation is acceptable.
fClr	The maximum acceptable forward CLR value to be used for this expansion. Can range from 1 to 15. A CLR value of x means 10 ^{-x} ; e.g., 5 means 10 ⁻⁵ . any_value means that any amount of cell loss is acceptable.
bClr	The maximum acceptable backward CLR value to be used for this expansion. Can range from 1 to 15. A CLR value of x means 10 ^{-x} ; e.g., 5 means 10 ⁻⁵ . any_value means that any amount of cell loss is acceptable.
Name	An optional text string associated with this entry to help you identify it.

You can also display information for a specific index or QOS class. Enter the following:

```
myswitch::configuration qos> show [<QoSExpIndex> [<QoSclass>]]
myswitch::configuration qos> show 0 3
QoSExp QoS
Index Class fCtd(us) fCdv(us) bCdv(us) fClr bClr Name
0 3 ANY_VAL ANY_VAL ANY_VAL ANY_VAL ANY_VAL def_class_3_expn
```

The fields in this display are defined in the same manner as those in the previous example.

CHAPTER 6

QOS Extension Table Commands

These commands let you delete, create, or display information about Quality of Service (QOS) extension table entries. The QOS extension table is used to hold a set of QOS parameters of maxctd, maxcdv, and maxclr. When creating a VPT using the conf vpt new command, the external QOS contribution of an originating/terminating path for a certain traffic type can be specified by an index pointing to this table. You can display the list of available subcommands by typing? at the qosext level.

```
myswitch::configuration qosext> ?
  delete    modify    new    show
```

6.1 Deleting a QOS Extension Table Entry

This command allows you to delete a QOS extension table entry. Enter the following:

```
myswitch::configuration gosext> delete < QoSExtIndex>
```

6.2 Modifying a QOS Extension Table Entry

This command allows you to modify a set of QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> modify <QoSExtIndex> [-maxctd <maxctd>]\
[-maxcdv <maxcdv>] [-maxclr <maxclr>]
```

6.3 Creating a QOS Extension Table Entry

This command lets you create a set of QOS extension table entry. Enter the following:

myswitch::configuration qosext> new <QoSExtIndex> <maxcdv> <maxcdr> <maxclr>

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
QoSExtIndex	The index number of the set of QOS extension parameters.
maxctd	The maximum cell transfer delay, in microseconds.
maxcdv	The maximum cell delay variation, in microseconds.
maxclr	The maximum cell loss ratio.

6.4 Displaying the QOS Extension Table

This command allows you to display the QOS extension table. Enter the following parameters:

myswitch::cor	nfigurat	cion qos	sext> show
QoSExtIndex	MaxCtd	MaxCdv	MaxClr
	(usec)	(usec)	
1	10	10	10
2	10	10	10
3	10	10	10
4	10	10	10
5	10	10	10
6	10	10	10
7	10	10	10
8	10	10	10
9	10	10	10

The fields in this display are defined as follows:

Field	Description
QoSExtIndex	The index number of the set of QOS extension parameters.
MaxCtd	The maximum cell transfer delay, in microseconds.
MaxCdv	The maximum cell delay variation, in microseconds.
MaxClr	The maximum cell loss ratio.

You can also display QOS information about a specific index by entering the following parameters:

If no QOS extension table has been created, then the following is displayed:

```
myswitch::configuration qosext> show
No Qos Extension information is available
```

QOS Extension Table Commands



CHAPTER 7 RS-232 Serial Port Commands

These commands let you manage the RS-232 serial port. You can display the list of available subcommands by typing rs232 ? at the configuration level.

myswitch::configuration> rs232 ? speed

7.1 Displaying Serial Port Information

This command allows you to show information about the configuration of the RS-232 serial port on the SCP. Type show at the rs232 configuration level to list the settings for the serial port. Enter the following parameters:

```
myswitch::configuration rs232> show [(A|B)]
```

These parameters are defined as follows:

Parameter	Description
A B	The port letter of the serial port to be displayed. Port B is not available.

```
myswitch::configuration rs232> show

Port Type Speed Flow Bits Stops Parity

A rs232 9600 none 8 one none
```

The fields in this display are defined as follows:

Field ¹	Description
Port;	The physical port designation
Туре	The signalling standard used.
Speed	The receive/transmit rate.
Flow	The type of flow control implemented on the given port.
Bits	The number of bit times in a single character.
Stops	The number of stop bits in a character frame.
Parity	The parity setting for the ports.

^{1.} All of these fields are read-only.

CHAPTER 8

Security Configuration Commands

These commands let you configure various security methods on a switch. You can display the list of available subcommands by typing? at the security level.

```
myswitch::configuration security> ?
  ipaccess> kerberos> login> nsapfiltering>
  templates>
```

8.1 IP Access Configuration Commands

These commands let you configure IP filtering at the control port of the switch to prevent unauthorized access to the switch. You can display the list of available subcommands by typing? at the ipaccess level.

```
myswitch::configuration security ipaccess> ?
accept delete ssr lsr
all show
```



These commands are only available to users who have admin privileges. See Section 8.3.5 for more information about admin privileges.

8.1.1 Configuring an Authorized IP Address

This command lets you create an entry in the table of authorized IP addresses from which IP packets will be accepted. The switch performs inbound filtering by determining if there is a match between the header source address and the table of authorized incoming IP addresses. If the addresses match, the packets are accepted, provided that they meet the requirements set up by the conf security ipaccess ssr, lsr, and all commands; otherwise, they are rejected. The table of authorized IP addresses, which can contain a maximum of 32 entries, will persist across a reboot. Enter the following parameters:

```
myswitch::configuration security ipaccess> accept <ipaddr> <mask>
```

By applying a mask to an IP address entry, you can specify a wild card range of allowable addresses. For example, an IP address of 163.26.54.6 with a mask of 255.255.255.255 means only address 163.26.54.6 is accepted against that entry. However, an IP address of 163.26.54.6 with a mask of 255.255.0.0 means addresses 163.26.** are accepted against that entry.

8.1.2 Deleting an Authorized IP Address

This command lets you delete an entry in the list of authorized IP addresses from which IP packets will be accepted. Enter the following parameters:

```
myswitch::configuration security ipaccess> delete <ipaddr> <mask>
```

These parameters for accept and delete are defined as follows:

Parameter	Description
ipaddr	The authorized incoming IP address.
mask	The mask that indicates the significant part of the incoming IP address to be used to find a matching address in the table of authorized addresses. A mask of 0.0.0.0 is a wild card that matches all addresses. A mask must have contiguous higher order 1 bits set to be valid; e.g., mask 255.255.0.128 is not valid, but 255.255.128.0 is valid.

CAUTION



If you delete all entries from the table of authorized IP addresses, be sure that the last entry you delete is the one that matches the address of the machine at which you are sitting. Otherwise, you will be locked out of the switch.

ecurity Configuration

8.1.3 Rejecting/Accepting Strict Source Routed Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all strict source routed packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> ssr (allow | disallow)
```

8.1.4 Rejecting/Accepting Loose Source Routed Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all loose source routed packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> lsr (allow | disallow)
```

8.1.5 Rejecting/Accepting All Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all IP packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> all (allow | disallow)
```

The parameters for ssr, lsr, and all are defined as follows:

Parameter	Description
allow	Setting ssr to allow means that all incoming IP packets that are strict source routed are accepted, provided that they match an IP address in the table of authorized addresses.
	Setting lsr to allow means that all incoming IP packets that are loose source routed are accepted, provided that they match an IP address in the table of authorized addresses.
	Setting all to allow means that all incoming IP packets are accepted, provided that they match an IP address in the table of authorized addresses. Setting all to allow is the default setting.
disallow	Setting ssr to disallow means that all incoming IP packets that are strict source routed are rejected, even if they match an IP address in the table of authorized addresses.
	Setting lsr to disallow means that all incoming IP packets that are loose source routed are rejected, even if they match an IP address in the table of authorized addresses.
	Setting all to disallow means that all incoming IP packets are rejected, even if they match an IP address in the table of authorized addresses.

CAUTION



When the all flag is set to disallow, the only way you can access the switch is via the serial port.



Information about all rejected packets (except for rejected broadcast packets) can be sent to syslog by using the debug trace filtering ipfilter on command.

8.1.6 Displaying IP Access Information

This command lets you display information about the IP filters that have been configured.

myswitch::configuration security ipaccess> **show**Accepting IP traffic from the following addresses:

IpAddress Mask

 198.24.65.2
 255.255.255.255

 204.19.95.89
 255.255.255.0

Configuration Flags:

Flag State
all allow
ssr allow
lsr allow

The fields in this display are defined as follows:

Field	Description
IpAddress/Mask	The table of authorized incoming IP addresses and their corresponding masks, if applicable. The mask indicates the significant part of the incoming IP address to be used in finding a matching address in this table. A mask of 0.0.0.0 is a wild card that matches all addresses. The addresses in the table are accepted, unless specifically rejected by a policy set by one of the configuration flags. The table can contain a maximum of 32 entries.
Flag/State	If ssr is allowed, all incoming IP packets that are strict source routed are accepted, provided that they match an IP address in the table of authorized addresses. If ssr is disallowed, all incoming IP packets that are strict source routed are rejected, even if they match an IP address in the table of authorized addresses.
	If lsr is allowed, all incoming IP packets that are loose source routed are accepted, provided that they match an IP address in the table of authorized addresses. If lsr is disallowed, all incoming IP packets that are loose source routed are rejected, even if they match an IP address in the table of authorized addresses.
	If all is allowed, all incoming IP packets are accepted, provided that they match an IP address in the table of authorized addresses. If all is disallowed, all incoming IP packets are rejected, even if they match an IP address in the table of authorized addresses.

If an entry in the table is preceded by an asterisk (*), this means that the entry has been created via SNMP, but is not active yet. The switch will not change its filtering policy based on that entry until the entry has become active.

If no addresses have been configured in the table and no flags have been set to disallow packets, then something similar to the following is displayed:

```
myswitch::configuration security ipaccess> show
Accepting IP traffic from the following addresses:
   All IP source addresses are being accepted
```

Configuration Flags:

Flag	State
all	allow
ssr	allow
lsr	allow

CAUTION



When the IP address table is empty, all addresses are accepted. This is the default state. Therefore, it is recommended that at least one address be entered into the table. Otherwise, anyone may access the switch via the control port. The address you enter must be the address of the machine you are using. Otherwise, you will lock yourself out of the switch.

Security Configuration Commands

You can also display information about a specific IP address as follows:

If that address is not in the table, then the following message is displayed:

```
No table information for 198.67.0.3 is available.
```

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8.2 Kerberos Configuration Commands

These commands let you configure Kerberos version 5 authentication. Kerberos is an authentication service that allows users and services to authenticate themselves to each other. Through the use of a DES encrypted telnet session with Kerberos authenticated session key exchange, this service gives users access to a higher level of security and privacy not available through other methods. *ForeThought* 6.0 supports the Cygnus Kerbnet 1.2 version of Kerberos which is a commercialized version of MIT Kerberos Version 5.

myswitch::configuration security kerberos> ?
realm show host> v5srvtab>



Only users with admin privileges have read and write access to these commands. See Section 8.3.5 for more information about admin privileges.



Kerberos authentication via Kerberos version 4 or Transarc AFS Kerberos is not supported.



It is assumed that a Kerberos server with the database program (also known as the Key Distribution Center or KDC) is running on a network host. For more information, see the documentation for your Kerberos software.



Ensure that the time on the switch is set correctly using the oper date AMI command. Kerberos does not utilize the time zone, but rather uses the switch's clock directory which is in GMT. The oper date command uses the time zone to convert the local time zone to GMT. The time set on the switch must be within five minutes of the time on the KDC (or to whatever time change defined on the KDC). Otherwise, authentication will fail since Kerberos will assume that someone is trying a replay attack. See Section 3.2 of the ATM Management Interface (AMI) Manual for more information.



The Network Time Protocol (NTP) can be used so that the switch and KDC will use the same synchronization source. Use the AMI command conf switch ntp to configure NTP for the switch. See Section 13.8 in Chapter 13 for more information.

Currently, the Kerberos AMI configuration commands are disabled for international versions of *ForeThought* software since the data encryption method used for Kerberos is not licensed for foreign distribution. The following message displays if a Kerberos command is executed on an international version of *ForeThought*:

```
myswitch::configuration security kerberos> show
Kerberos is not supported in international versions of ForeThought.
```

8.2.1 Setting or Deleting the Kerberos Realm

This command lets you set or delete the Kerberos default realm. The Kerberos realm is a domain consisting of users and services that are registered to the KDC.

```
myswitch::configuration security kerberos> realm [(set | clear)] <kerberos realm>
```

The parameters are defined as follows:

Parameter	Description
set	Define the default realm.
clear	Delete the default realm.
kerberos realm	The name of the defined default realm.

For example, you would enter something similar to the following:

```
myswitch::configuration security kerberos> realm set FORE.COM the default realm is FORE.COM
```

To simply display the realm name, enter realm with no parameters specified:

```
myswitch::configuration security kerberos> realm
the default realm is FORE.COM
```

If a default realm name has not been defined, the following displays:

```
myswitch::configuration security kerberos> realm the default realm is *not defined*.
```

8.2.2 Displaying Kerberos Configuration Information This command displays a summary of the Kerberos configuration on the switch.

This command displays a summary of the Kerberos configuration on the switch. The information displayed includes the version of Kerberos running on the switch, the default realm, and the contents of the v5srvtab file. The v5srvtab file (also referred to as the keytab file) contains the Kerberos principal-to-key mapping database. See Section 8.2.4 for more information about the keytab file.

 $\verb|myswitch|::configuration| security | kerberos > \verb|show||$

Kerberos 5 Version: Cygnus kerbnet-1.2

Default Realm: FORE.COM

Principal	Encryption Type	KVNO
	=======================================	======
host/fish.fore.com@FORE.COM	des_cbc_crc32	4
host/shark.fore.com@FORE.COM	des_cbc_crc32	4

The fields are defined as follows::

Field	Description
Principal	A three-part string that identifies a service or user to which a set of credentials (authentication tickets) may be assigned. The first part of the string identifies the type of service (for a service principal) or user name (for a user principal). The second part is separated by the / character and identifies the qualified host name offering the service (for a service principal) or is left blank (for a user principal) The third part indicates the realm.
Encryption Type	Encryption type used to encrypt the principal keys.
KVNO	The key version number. This indicates how many times the principal's key has been extracted from the KDC. Every time the principal's key is extracted, the key changes and the KVNO is incremented by 1 so that any previously extracted copies in other v5srvtab files become invalid.

If the realm has not been defined and the v5srvtab file has not been installed on the switch, the following message displays:

myswitch::configuration security kerberos> **show**Kerberos 5 Version: Cygnus kerbnet-1.2
Default Realm : *not defined*
The v5srvtab file is not installed.

8.2.3 Host Table Commands

This command lets you manage the host table which defines the IP address-to-hostname mapping for the local machine's interface. This table enables Kerberos to build a principal from an IP address. A principal is a three-part string that identifies a service or user to which a set of credentials (authentication tickets) may be assigned.

Type? at the host level to display a list of available subcommands.

8.2.3.1 Adding Entries to the Host Table

This command lets you add an IP address and host name to the host table. Enter the following parameters:

```
myswitch::configuration security kerberos host> new <ip address>
<fully qualified host name>
```

The parameters are defined as follows:

Parameter	Description	
ip address	The authorized incoming IP address.	
fully qualified host name	The name of the host.	

For example, you would enter something similar to the following:

```
myswitch::configuration security kerberos host> new 192.144.8.12 fish.fore.com
```

8.2.3.2 Deleting Entries from the Host Table

This command lets you delete an IP address-to-hostname mapping from the host table. Enter the following:

```
myswitch::configuration security kerberos host> delete <ip address>
```

The parameter is defined as follows:

Parameter	Description
ip address	The IP address of the host you want to delete from the host table.

For example, you would enter something similar to the following:

```
myswitch::configuration security kerberos host> delete 192.144.8.12
```

8.2.3.3 Displaying IP Address and Host Name Mappings

This command lets you display the IP addresses and the host names to which they are mapped. The maximum number of entries allowed in the host table is 10.

myswitch::configuratio	n security	kerberos	host>	show
ip address	hostname			
=======================================	=======			-==
192.144.8.12	fish			
169.120.20.15	shark			

8.2.4 Kerberos v5srvtab File Commands

These commands let you manage a copy of the v5srvtab file (also referred to as keytab) on the switch. The v5srvtab file is generated by the Kerberos server and contains a list of various principals and their encrypted keys. A copy of this file must be installed on the switch. Type? at the v5srvtab level to display the list of available subcommands.

```
myswitch::configuration security kerberos v5srvtab> ?
delete    install     show
```

8.2.4.1 Installing the v5srvtab File on the Switch

This command lets you install a copy of the v5srvtab file from the Kerberos server to the switch using FTP or TFTP. You will be prompted to enter your username and password before the transfer can be successfully completed. Enter the following:

```
myswitch::configuration security kerberos v5srvtab> install [<host>:]
<full path to keytab file>
```

The parameters are defined as follows:

Parameter	Description
host	The IP address of the host where the v5srvtab file resides.
full path to keytab file	The full path to the v5srvtab file.

For example, you would enter something similar to the following:

```
myswitch::configuration security kerberos v5srvtab> install 192.144.8.12:
/us/v5srvtab
Remote userid: jsmith
Remote password:
   {Transfer successful}
```

v5srvtab file installation is successful.

8.2.4.2 Deleting the v5srvtab File

This command lets you delete the existing v5srvtab file installed on the switch. Enter the following:

myswitch::configuration security kerberos v5srvtab> delete

8.2.4.3 Displaying the Contents of the v5srvtab File

This command lets you display the readable contents of the Kerberos v5srvtab file. Enter the following:

myswitch::configuration security ke	erberos v5srvtab> show	
Principal	Encryption Type	KVNO
		=======
host/magic.fore.com@FORE.COM	des_cbc_crc32	3
host/shark.fore.com@FORE.COM	des_cbc_crc32	2



See Section 8.2.2 for the field definitions.

If the v5srvtab file is not installed, the following message displays:

myswitch::configuration security kerberos v5srvtab> **show**The v5srvtab file is not installed.

8.3 Login Userid Configuration Commands

These commands allow you to configure various login userids, to assign privilege levels to the userids, and to display information about the userids. To display the list of available subcommands, type? at the login level.

myswitch::configuration security login> ?

backup delete finger modify
new password restore securid>
show upriv whoami



More information about userids and other methods of security can be found in Chapter 8 of the *ATM Switch Network Configuration Manual*.

8.3.1 Backing Up the Login Userid File

This command lets you make a backup of the file that contains all of the login IDs and information. This command is only available to users with admin privileges. Enter the following:

myswitch::configuration security login> backup [<host>:]<full path to backup file>

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host to which the login file will be backed up.
full path to backup file	The full path name of the file to which the login file will be backed up.

If you have configured the transfer protocol to be FTP using conf system protocol, you only need to enter the command shown above to perform the file backup. After you enter the command shown above, you are prompted for the remote userid and password of the remote host to which you are backing up the file.

If you have configured the transfer protocol to be TFTP (this is the default) using conf system protocol, the remote host to which the file will be backed up must be running the TFTP server code. If you are unsure of how to do this, see the ATM Switch Installation and Maintenance Manual for your switch.

If you are using TFTP to perform the login file backup, you must first create an empty file in the /tftpboot directory on the remote host to receive the file. Use the touch command to do this. Then, use the chmod command to change the permissions of that file so that it will let the switch write the backup login file to that file.

Perform the following steps to back up your login file:

- 1. First, telnet to your remote host and log in.
- 2. Enter the following commands in sequence:

cd /tftpboot
touch <backup file name>
chmod 777 <backup file name>

- 3. Then exit from the telnet session.
- 4. Telnet to the switch and log into AMI.
- 5. Enter the following command:

conf security login backup <host>:/tftpboot/<backup file name>

You will receive a confirmation message that the backup was successful.

8.3.2 Deleting a Userid

This command lets you delete a current userid. This command is only available to users with admin privileges. Enter the following parameters:

myswitch::configuration security login> delete <userid>

These parameters are defined as follows:

Parameter	Description
userid	The userid that you want to delete. Use conf security login show to display a list of the current userids.

Security Configuration

8.3.3 Enabling or Disabling Fingering

This command lets you enable or disable the finger mechanism which displays information about the user who is currently logged into the switch. This information includes: the userid of the person who is currently logged in, how long the person has been logged on, the IP address of the machine on which the person logged in, the amount of time the system has been idle, the current percentage of processor utilization, the minimum percentage of processor utilization, and the maximum percentage of processor utilization. Enter the following parameters:

```
myswitch::configuration security login> finger [(enable | disable)]
```

These parameters are defined as follows:

Parameter	Description
enable	Enables the finger mechanism. This allows you to view information about the user who is currently logged into the switch. To view this information, log in to a host that is attached to the switch. Then, run the finger command on the host using either the switch's IP address or name. For example: finger 169.144.21.8.
disable	Disables the finger mechanism so that no information is displayed about the user who is currently logged into the switch. This is the default.

If you enter the finger command with no parameter specified, the current state of the finger mechanism is displayed as follows:

```
myswitch::configuration security login> finger The finger port is disabled.
```

8.3.4 Modifying a Userid

This command lets you modify the authentication method, privileges, and/or login access of the current userids. This command fails if the specified userid does not exist. This command is only available to users with admin privileges. A user with admin privileges can change his own authentication method or login access; however, the change will not take effect until that user logs in again. A user with admin privileges can also change his own password and privilege level; these changes take effect immediately. Enter the following:

```
myswitch::configuration security login> modify <userid>
        [-auth (local | securid)]
        [-priv (admin | user)]
        [-access (all | network | serial | none)]
```

8.3.5 Creating a Userid

This command lets you create a userid. This command is only available to users with admin privileges. Enter the following parameters:

This command fails if the specified userid already exists. The switch software prompts you to assign a password to the userid, regardless of the authentication method used. Null local passwords are accepted. The switch does not echo your keystrokes when you enter the password. For example:

```
network

New local password: <new local password>
Retype new local password: <new local password>
```

myswitch::configuration security login> new mktg -auth local -priv user -access

New userid mktg created with local authentication, user privileges and network login access.

The r	parameters	for mod	lify and	new are	defined	as follows:
1110	Jul ullicteld	IOI IIIOG	iii y uiiu	IIC VV UIC	ucilicu	us romo ws.

Parameter	Description
userid	The name of the userid that you want to create/modify. The maximum size of a userid is 16 characters. Any characters are allowed, except the colon (:) character and a blank return.
-auth (local securid)	The authentication method for this userid. local means that the correct local password for this userid must be supplied to log in to a switch. securid means that the correct SecurID passcode must be supplied to log into a switch. There are some exceptions. See the ATM Switch Network Configuration Manual for more information about these authentication methods and the exceptions. The default is local.
-priv (admin user)	The privilege level for this userid. admin means a person with this userid is allowed to use all AMI commands. user means a person with this userid can use all AMI commands, except the following: conf security login backup, conf security login delete, conf security login modify, conf security login new, conf security login password (to modify passwords other than your own), conf security login restore, conf security login show, all conf security login securid commands, all conf security ipaccess commands, all conf security nsapfiltering commands, conf snmp sets, and all debug commands. The default is admin.
-access (all network serial none)	A person with the userid serial is allowed to login only via the serial port. A person with the userid network is allowed to login only via telnet. A person with the userid all is allowed to login via the serial port and via telnet. A person with the userid none is not allowed to log in to the switch at all. The default is all.

Security Configuration Commands

8.3.6 Setting or Changing a Password for a Userid

This command lets you set or change the local password for a userid. This command replaces the oper password command. The password can be up to 512 characters long. Enter the following parameters:

```
myswitch::configuration security login> password [<userid>]
```

When the password is changed, the old password must be entered correctly before a new password can be entered. However, a user logged in with admin privileges can change any userid password without first entering the old local password, except their own. For example:

```
myswitch::configuration security login> password mktg
  Old local password: <old local password>
  New local password: <new local password>
  Retype new local password: <new local password>
```

These parameters are defined as follows:

Parameter	Description	
userid	The userid for which you want to set or change the local login password. If no userid is entered, the local userid is assumed to be the one for which you are setting or changing the password.	

8.3.7 Restoring the Login File

This command allows you to restore the login file after you have backed it up. This command is only available to users with admin privileges. Enter the following parameters:

```
myswitch::configuration security login> restore [<host>:]<full path to restore file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host on which the login file that is to be restored resides.
full path to backup file	The full path name of the login file that is to be restored.

If you have configured the transfer protocol to be FTP using conf system protocol, you only need to enter the command shown above to perform the login file restore. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file.

If you have configured the transfer protocol to be TFTP (this is the default) using conf system protocol, the remote host from which the file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see the *ATM Switch Installation and Maintenance Manual* for your switch.

8.3.8 Configuring SecurID

These commands let you configure SecurID on a switch. This means that all users who have their authentication method configured as securid will be validated by the SecurID server when they attempt to log in to that switch. You must have a SecurID server running in order to use these commands. For more information about SecurID, see the ATM Switch Network Configuration Manual. To display the list of commands, type securid? at the login level.

8.3.8.1 Getting the Securld Configuration File

If you have SecurID enabled on a switch, this command lets you retrieve the SecurID configuration file which contains information that the SecurID server and the switch need to communicate with each other. Enter the following parameters:

```
myswitch::configuration security login securid> getconf
<host>:<full path to sdconf.rec file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host on which the SecurID file resides.
full path to sdconf.rec file	The full path name of the SecurID file that is to be restored.

If you have configured the transfer protocol to be FTP using conf system protocol, you only need to enter the command shown above to retrieve the configuration file. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file.

If you have configured the transfer protocol to be TFTP (this is the default) using conf system protocol, the remote host from which the file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see the ATM Switch Installation and Maintenance Manual for your switch.

ecurity Configuration Commands

8.3.8.2 Deleting the SecurID File

This command lets you delete either the SecurID configuration file (sdconf.rec) or the node secret file. The configuration file contains information that the SecurID server and the switch need to communicate with each other. The node secret file is a string of about 16 bytes that the switch receives the first time it contacts the server. This string, which is known only to the server and this switch, is used in encrypting messages between the server and the switch. Both of these files are stored in the FLASH. This command is only available to users with admin privileges. Enter the following parameters:

```
myswitch::configuration security login securid> delete (conf | secret)
```

These parameters are defined as follows:

Parameter	Description
conf	Indicates the SecurID configuration file (sdconf.rec) is to be deleted from FLASH.
secret	Indicates the node secret file is to be deleted from FLASH.

8.3.8.3 Displaying the SecurID File

This command lets you display the contents of the SecurID configuration file. However, if you wish to edit the file, you must do so on the server machine. Then you must use the conf security login securid get command to retrieve the new file. When you use this command, it overwrites the existing file. Enter the following parameters:

```
myswitch::configuration security login securid> showconf
SecurID Client Configuration

ACE/Server VERSION: v 2.1.104

CLIENT RETRY: 5 times

CLIENT TIMEOUT: 5 sec
BAD PASSCODES: 3

DES ENCRYPTION: allowed and enabled

DURESS MODE: not allowed

MASTER SERVER: linus

MASTER SERVER ADDRESS: 204.95.89.107

PORT NUMBER: 1024

AUTHENTICATION SERVICE: securid
```

If there is no file or if the file is damaged, the following is displayed:

```
myswitch::configuration security login securid> showconf
Securid configuration file does not exist or is corrupted.
```

8.3.8.4 Displaying Userid Information

This command lets you display all of the current userids and their assigned authentication methods, privilege levels, and login access levels. This command is only available to users with admin privileges. Enter the following parameters:

myswitch::configuration security login> show			
	Authentication		Login
Userid	Method	Privileges	Access
1234567890123456	local	user	all
ami	local	admin	all
is&s	local	admin	all
marketing	securid	user	network

The fields in this display are defined as follows:

Field	Description
Userid	The userids currently available on this switch. On a new switch, there are two separate default userids: ami and asx. Both are configured with the local authentication method, with admin privileges (meaning you may use all AMI commands), and all access (meaning you are allowed to login to the switch using all the possible methods). Both userids are assigned a null password. On switches that are upgraded to ForeThought 5.0.x or greater, if a password file already existed, both userids are assigned that same password.
Authentication Method	The authentication method for this userid. local means that the correct local password for this userid must be supplied to log in to a switch. securid means that the correct SecurID passcode must be supplied to log into a switch. There are some exceptions. See the ATM Switch Network Configuration Manual for more information about these authentication methods and the exceptions. The default is local.
Privileges	The privilege level for this userid. admin means a person with this userid is allowed to use all AMI commands. user means a person with this userid can use all AMI commands, except the following: conf security login backup, conf security login delete, conf security login modify, conf security login new, conf security login password (to modify passwords other than your own), conf security login restore, conf security login show, all conf security login securid commands, all conf security ipaccess commands, all conf security nsapfiltering commands, conf snmp sets, and all debug commands. The default is admin.
Login Access	A person with the userid serial is allowed to login only via the serial port. A person with the userid network is allowed to login only via telnet. A person with the userid all is allowed to login via the serial port and via telnet. A person with the userid none is not allowed to log in to the switch at all.

8.3.9 Displaying and Changing Unlisted User Privileges

This command allows you to display the privileges on the switch. To display this information, enter upriv at the login level.

```
myswitch::configuration security login> upriv
Unlisted users' privileges set to "admin"
```

This command also lets you change the privileges of any users who are not listed on the switch. To set or change this information, enter the following parameters:

```
myswitch::configuration security login> upriv [<admin|user>]
```

The fields in this display are defined as follows:

Parameter	Description
admin user	If a user is not listed on the switch, but is authenticated by the SecurID server, then the user is assigned the privilege level that is configured here. user means all unlisted users logging to this switch are given user level privileges (the ability to access only a certain subset of the AMI commands). admin means all unlisted users logging to this switch are given admin level privileges (the ability to access all of the AMI commands). The default is admin.

8.3.10 Displaying the Current Userid

This command shows the userid of the user who is currently logged into the switch. Enter the following parameters:

myswitch::configuration security login> whoami

8.4 Configuring NSAP Filtering

These commands provide a mechanism for filtering calls based on a combination of the calling (source) and called (destination) addresses, as well as the source ports, VPIs, NSAP addresses, and NSAP address masks, and the destination ports, VPIs, NSAP addresses, and NSAP address masks. More information about NSAP filtering and other methods of security can be found in the *ATM Switch Network Configuration Manual*. To display the list of available subcommands, type? at the nsapfiltering level.

```
myswitch::configuration security nsapfiltering> ?
filters> interfaces>
```



SPVCs SPVPs, PVPs, and PVCs are not supported by NSAP filtering.

8.4.1 Configuring NSAP Filters

These commands allow you to configure NSAP filters. To display the list of available subcommands, type? at the filters level.

8.4.1.1 Adding a Template to an NSAP Filter

This command lets you add a new template to a filter that already exists. It creates the filter, if the filter does not already exist. (To create a new filter, you can also use the conf security nsapfiltering filters new command.) Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> add <filter-id>
<template-id or template-name> [-before <template-id or template-name>]
```

The parameters for add are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index.
template-id or template- name	The unique, user-assigned identifier or name for this template. A template-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index.
-before <template-id or<br="">template-name></template-id>	When adding a template to a filter, indicates that the template you are adding will be placed before the specified $<$ template-id or template-name $>$ in the filter's ordering scheme. If this parameter is not specified, then the template is added to the end of the list in the filter.

^{1.} When you specify -before < template-id or template-name>, the order in which the templates are listed in the filter will change as you add or delete more templates.

8.4.1.2 Deleting an NSAP Filter

This command lets you delete a template from a filter or delete an entire filter. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> delete <filter-id>
(<template-id or template-name> | -all )
```

The parameters for delete are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index.
template-id or template- name -all	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index. If $ or template-name> is specified, then only that template is deleted from the filter. If -all is specified, the entire filter is deleted.$

8.4.1.3 Testing Against an NSAP Filter

This command allows the user to enter components of a call setup message to test whether a call setup attempt with the supplied addresses and ports would be accepted or rejected by a specific filter. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> lookup <filter-id>
    [ -srcport <port> ] [ -srcvpi <vpi> ] -srcnsap <nsap>
    [ -dstport <port> ] [ -dstvpi <vpi> ] -dstnsap <nsap>
```

These parameters are defined as follows:

Parameter	Description
lookup <filter-id></filter-id>	The filter against which you are testing the call setup message.
-srcport <port></port>	The source port of the call setup message.
-srcvpi <vpi></vpi>	The source virtual path number of the call setup message.
-srcnsap <nsap></nsap>	The source NSAP address of the call setup message.
-dstport <port></port>	The destination port of the call setup message.
-dstvpi <vpi></vpi>	The destination virtual path number of the call setup message.
-dstnsap <nsap></nsap>	The destination NSAP address of the call setup message.

The switch returns an answer of either accepted or rejected, and the template-id of the specific template that accepted or rejected the tested call setup message. If the message does not match any of the templates in the filter, the switch returns an answer of rejected and address unknown.



This command is simply a test. Therefore, if a message is rejected, it does not increment the address validation counters, enter the result in the table that shows the last failure, nor send a trap.

8.4.1.4 Creating an NSAP Filter

This command lets you create a new filter that contains the templates you specify in the order in which you specify them.

```
myswitch::configuration security nsapfiltering filters> new <filter-id>
<template-id or template-name> [<template-id or template-name>]*
```

The parameters for new are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index. If the filter already exists, you receive an error message. If a template-name is specified without a numeric index, an index is assigned to the filter and shown to you.
template-id or template- name	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A template-name may be up to 20 characters. Zero is not a valid index. The * in this command means that you can add as many template-ids to this filter as you wish.

8.4.1.5 Displaying NSAP Filter Information

This command lets you display all of the NSAP filters that have been configured on the switch. Enter the following parameters:

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this filter.
Name	An optional, user-assigned name that identifies this filter.
Template IDs	The template-name or index number of each template in this filter. The templates are applied in the order in which they are listed in the filter.

You can also display an individual NSAP filter. If you specify **-templates**, then the templates in that filter are displayed as well. Enter the following parameters:

The fields in this display are defined in the same manner as those in the previous example. If no NSAP filters have been configured, then the following message is displayed:

```
myswitch::configuration security nsapfiltering filters> show
No Address Filters are present
```

ecurity Configuration

8.4.2 Configuring NSAP Filter for Interfaces

These commands let you configure filters for incoming call setup requests and for outgoing call setup requests for ATM Forum signalling interfaces, such as UNI, NNI, IISP, etc. To display the list of available subcommands, type? at the interfaces level.

8.4.2.1 Deleting an NSAP Filter from an Interface

This command lets you delete an NSAP filter from an interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> delete <port> <vpi>(incoming | outgoing)
```

8.4.2.2 Configuring an NSAP Filter on an Interface

This command lets you configure an NSAP filter on an interface. You can only configure one incoming and one outgoing filter per interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> set <port> <vpi><filter-id> (incoming | outgoing)
```

The parameters for delete and set are defined as follows:

Parameter	Description
port	The port number of the interface to which the filter applies.
vpi	The virtual path number of the interface to which the filter applies.
filter-id	The unique name or index number that identifies this filter.
incoming outgoing ¹	incoming means that the filter applies to the incoming side of the interface. outgoing means that the filter applies to the outgoing side of the interface. If no incoming filter is specified for an interface, then all incoming calls are accepted on that interface. If no outgoing filter is specified for an interface, then all outgoing calls are accepted on that interface.

Calls to the switch itself (SNMP connections, telnet over ATM, etc.) can be filtered by setting an outgoing filter on the control port.

8.4.2.3 Displaying NSAP Filter Interface Information

This command lets you display all of the incoming and outgoing filters that have been configured on a specific interface. Enter the following parameters:

myswitch::configuration security nsapfiltering interfaces> show			
Port	VPI	Incoming Filter ID	Outgoing Filter ID
1A1	0	21	0
1A2	0	459 keep_them_out	94
1A3	0	0	0
1A4	0	0	36 filter_36
1D1	0	0	0
1D2	0	0	0
1D3	0	0	01
1D4	0	0	0
1CTL	0	0	37 ctlport

The fields in this display are defined as follows:

Field	Description
Port	The port number of the interface to which the filter applies.
VPI	The virtual path number of the interface to which the filter applies.
Incoming Filter ID	The unique index number or name that identifies this incoming filter.
Outgoing Filter ID	The unique index number or name that identifies this outgoing filter.

You can also display the filters for a specific port and/or VPI; or the actual filters themselves, which shows all of the templates in each filter; or the actual templates themselves.

```
myswitch::configuration security nsapfiltering interfaces> show [<port> [<vpi>]]
[-filters] [-templates]
```

For example, to display the filters, enter the following parameters:

myswi	$\verb myswitch ::configuration security \verb nsapfiltering interfaces \verb show -filters \\$				
Port	VPI	Direction	Filter	Name	Template IDs
1A1	0	Incoming	21		10 12 40
1A2	0	Incoming	459	keep_them_out	45 46 47 48
1A2	0	Outgoing	94		49 50
1A4	0	Outgoing	36	filter_36	3984
1CTL	0	Outgoing	37	ctlport	625

8.5 Configuring Templates

These commands allow you to configure the templates that are used in NSAP filters. To display the list of available subcommands, type? at the templates level.

8.5.1 Deleting a Template

This command lets you delete a template that has not been added to any filter yet. If the template has already been added to one or more filters, then it must be deleted from each filter list using the **conf sec nsapfilter filters delete** <template-id or template-name> command. Enter the following parameters:

```
myswitch::configuration security templates> delete
<template-id or template-name>
```

8.5.2 Creating a Template

This command lets you create a template. Enter the following parameters:

8.5.3 Modifying a Template

This command lets you modify individual items in a template. If the template is currently in use by a filter, then the changes take effect immediately. Enter the following parameters:

```
myswitch::configuration security templates> modify <template-id or
    template-name>
    [-name <New name string>]
    [-srcport <port>] [-srcvpi <vpi>]
    [-srcnsap <nsap>] [-srcmask <mask>]
    [-dstport <port>] [-dstvpi <vpi>]
    [-dstnsap <nsap>] [-dstmask <mask>]
    -action (accept | reject)
```



If you apply an NSAP filter to a port connected to a LANE client, the client may still receive traffic from the blocked source indirectly, through the LANE BUS.

The parameters for delete, new, and modify are defined as follows:

Parameter	Description
template-id or template- name	The unique, user-assigned identifier for this template. A template-id or template-name can be either a positive, decimal integer (index) or a string name. If it is specified as a numerical index, then the Name field is left blank. Zero is not a valid index. A template-name may be up to 20 characters. If a template-name is specified without an index, the switch assigns a numerical index and shows it to you.
-name <new name="" string=""></new>	An optional, user-assigned name that helps to identify this template.
-srcport <port></port>	The source port of the call setup message. An asterisk (*) is a wild card that matches all ports.
-srcvpi <vpi></vpi>	The source virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
-srcnsap <nsap></nsap>	The source NSAP address of the call setup message.
-srcmask <mask></mask>	The mask that indicates the significant part of the source NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
-dstport <port></port>	The destination port of the call setup message. An asterisk (*) is a wild card that matches all ports.
-dstvpi <vpi></vpi>	The destination virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.

Parameter	Description
-dstnsap <nsap></nsap>	The destination NSAP address of the call setup message.
-dstmask <mask></mask>	The mask that indicates the significant part of the destination NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
-action <accept reject="" =""></accept>	The action to take with addresses that match this template. accept means that the call will be allowed and reject means that the call will not be allowed.
-name <string></string>	An optional, user-assigned name that helps to identify this template.

8.5.4 Displaying Template Information

This command lets you display all of the templates that have been configured on the switch. Enter the following parameters:

```
myswitch::configuration security templates> show
                                      Source
                                                        Destination
Index Action Name
                                      Port VPI Mask
                                                        Port
                                                               VPI Mask
                                     1A1
                                                  128
                                                                 * 152
   1 accept let_these_in
Source NSAP: 0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
Destination NSAP: 0x47.0005.80.ffe100.0000.f21a.2a1d.0020481a2a17.00
   3 reject
                                                  104 1CTL
                                                                    152
                 0x47.0005.80.ffe100.0000.f215.11f2.0020487a3751.00
Source NSAP:
Destination NSAP: 0x47.0005.80.ffe100.0000.f215.11f2.00204825c418.00
   4 reject keep_these_out
                                     1A1
                                                  104
                                                        1CTL
                                                                      0
Source NSAP:
                 0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00
Destination NSAP: *
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this template.
Action	The action to take with addresses that match this template. accept means that the call is allowed and reject means that the call is not allowed.
Name	An optional, user-assigned name that identifies this template.
Source Port	The source port of the call setup message. An asterisk (*) is a wild card that matches all ports.
Source VPI	The source virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.

Field	Description
Source Mask	The mask that indicates the significant part of the source NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
Destination Port	The destination port of the call setup message. An asterisk (*) is a wild card that matches all ports.
Destination VPI	The destination virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
Destination Mask	The mask that indicates the significant part of the destination NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
Source NSAP	The source NSAP address of the call setup message. An asterisk (*) is a wild card that matches all NSAP addresses.
Destination NSAP	The destination NSAP address of the call setup message. An asterisk (*) is a wild card that matches all NSAP addresses.

You can also display an individual template. Enter the following parameters:

If no templates exist, then the following message is displayed:

```
myswitch::configuration security templates> show
No Address Filtering Templates are present
```

CHAPTER 9

Signalling Commands

These commands let you configure ATM Forum (UNI/PNNI) signalling channels. You can display the list of available subcommands by typing? at the signalling level.

9.1 Deleting a Signalling Channel

This command allows you to delete an existing signalling channel of a specific virtual path number or delete existing signalling channels in a range of virtual path numbers. Enter the following:

```
myswitch::configuration signalling> delete cprt> <vpi</pre>|vpi range (x-y)>
```

The parameters are defined as follows:

Field	Description
port	The port number of the signalling channel.
vpi	The virtual path number of the signalling channel.
vpi range (x-y)	The range of virtual path numbers in a port.

When deleting signalling channels in a range of VPIs, the total number of interfaces deleted is displayed. For example:

```
myswitch::configuration signalling> delete 4D4 20-30
Total number of Signalling interfaces deleted: 11
```

9.2 Modifying a Signalling Channel

This command allows you to modify an existing signalling channel. Enter the following parameters:

The parameters are defined in Section 9.3.

9.3 Creating a Signalling Channel

This command lets you create a signalling channel. Enter the following parameters:



Before a signalling channel can be created on a given VPI, an originating and a terminating path must exist for that same VPI.



Currently on Series 1 LC and LE network modules, a switch configured with these network modules in a FT-PNNI network should be configured with the <code>-sig_alloc</code> protocol option set to <code>link</code> and the <code>-sig_mode</code> protocol option set to <code>nonAssoc</code>. This includes current ASX-4000 configurations.



There is a maximum configurable limit on the number of signalling interfaces that can be created. The maximum limit depends on the switch platform. See the *ForeThought 6.0.x Release Notes* for the maximum limits.

```
myswitch::configuration signalling> new <port> <vpi>
         [-version (auto | uni30 | uni31 | pnni10 | uni40)]
         [-ilmi (up | down)] [-side (user | network)]
         [-type (auto | publicUNI | IISP | privateNNI | privateUNI)]
  atm layer options:
         [-sigvci <vci>] [-ilmivci <vci>]
         [-insigupc <upc-index>] [-outsigupc <upc-index>]
         [-minvci <vci>] [-maxvci <vci>] [-maxvpi <vpi>]
         [-vpcigroupid <vpci-group-index>]
  protocol options:
         [-sig_alloc (vp | link | auto)]
         [-sig_mode (nonAssoc | vpAssoc | auto)]
         [-qos_exp < QoSExpIndex>]
         [-accelerated_clear (disable | enable)]
  atmroute options:
         [-cost <cost>] [-domain <domain>]
  timer options:
```

```
[-sscopnoresp_timer <sec>]
public options:
    [-ilmireg (disable | ignore)]
    [-addressformat (private | e164)]
    [-e164address <e164Address>]
    [-e164mapping (enable | disable)]
    [-plantype (international | national | subscriber)]
iefilter (Information Element filtering) options:
    [-iefilter (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal])]
    [-defaultcpn <NSAPAddress>]
NSAP Address Filtering options:
    [-incomingfilter <filter-id>]
    [-outgoingfilter <filter-id>]
```

These parameters for the delete, modify, and new commands are defined as follows:

Parameter	Description
port	The port number of the signalling channel.
vpi	The virtual path number of the signalling channel.
-version	The version of the UNI protocol to use at initialization. auto means the UNI attempts to determine automatically which version of the UNI protocol to use. auto is the default. uni30 means this link uses version 3.0 of the UNI protocol. uni31 means this link uses version 3.1 of the UNI protocol. pnni10 means this link is an ATM Forum PNNI link. uni40 means this link uses version 4.0 of the UNI protocol. You must specify both the version and the type if you want one of them to be something other than auto. For a list of the allowable combinations and more information, see the ATM Switch Network Configuration Manual.
-ilmi	Enables ILMI for this interface (only when a host is connected). However, this parameter must be set to down if you set the interface type parameter to IISP. The default is up.
-side	The switch user side or network side. If the connection is to a host, choose network. If the connection is to another switch, one switch must be user and the other switch must be network when configuring the interface type as IISP or as publicUNI. If the type is not IISP or publicUNI, then you do not need to specify this value; it is determined automatically.
-type	The interface type to use for this signalling channel. auto means the interface type is determined dynamically. publicuni means this signalling channel is used between this switch and a public switch. IISP is used for switch-to-switch signalling. privateNNI means this signalling channel is using the PNNI protocol. privateUNI means this signalling channel is used between this switch and a host. The default is auto. You must specify both the version and the type if you want one of them to be something other than auto. For a list of the allowable combinations and more information, see the ATM Switch Network Configuration Manual.
-sigvci	The VCI to use for signalling messages.

Description
The VCI to use for ILMI messages.
The index number of the UPC traffic contract to be applied to the input signalling channel. Use conf upc show and look at the Index field to find this number. You cannot apply an ABR UPC contract to the input signalling channel.
The index number of the UPC traffic contract to be applied to the output signalling channel. Use <code>conf upc</code> show and look at the <code>Index</code> field to find this number. To prevent the outbound signalling channel from being policed, you <code>must</code> use the <code>nogCRA</code> option when creating the UPC contract. You cannot apply an ABR UPC contract to the output signalling channel.
The bottom number for the range of VCIs to be reserved for UNI SVCs on this path (and other paths created dynamically if the <code>-sig_alloc</code> flag is <code>link</code>). You can change this range to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs. The default is 32.
The top number for the range of VCIs to be reserved for UNI SVCs on this path (and other paths created dynamically if the <code>-sig_alloc</code> flag is <code>link</code>). You can change this range to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs. The default is the maximum number of VCIs on the containing path.
The maximum VPI value that is allocated for a Switched Virtual Paths (SVP) and for the switched portion of Smart Permanent Virtual Path Connections (SPVPs). The default is the maximum VPI value allowed by the switch fabric or network module.
The VPCI mapping group index used for a virtual UNI signalling interface. This index number can be found in the VPCIgroup-id field under conf sig vpcitable vpcigroup show. See Section 9.5 for information on this command.
The allocation policy for the network side of a signalling channel. vp means the network side allocates connections in its containing VP only. link means the signalling channel allocates connections in its containing VP and may allocate connections in other VPs in the VPI range 0 to 255 that are available to it. The link option is only available for signalling channels on VP 0. The link option cannot be specified when -sig_mode is specified as vpAssoc. The default is vp for FT-PNNI and link for PNNI. You must specify both the sig_alloc and the sig_mode if you want one of them to be something other than auto. For a list of the allowable combinations and more information, see the ATM Switch Network Configuration Manual. Currently on Series 1 LC and LE network modules, a switch configured with these network modules in a FT-PNNI network should be reconfigured with the -sig_alloc protocol option set to link and the -sig_mode protocol option set to nonAssoc. This

Parameter	Description
-sig_mode	The mode to be used for signalling. nonAssoc (Non-associated signalling) means the signalling channel encodes the connection identifier with Non-associated signalling bits. vpAssoc (VP-associated signalling) means the signalling channel encodes the connection identifier with the VP-associated signalling bits. The default is nonAssoc for FT-PNNI and vpAssoc for PNNI, except VP 0 which must be nonAssoc. You must specify both the sig_alloc and the sig_mode if you want one of them to be something other than auto. For a list of the allowable combinations and more information, see the ATM Switch Network Configuration Manual. Currently on Series 1 LC and LE network modules, a switch configured with these network modules in a FT-PNNI network should be reconfigured with the -sig_mode protocol option set to nonAssoc and the -sig_alloc protocol option set to link. This includes current ASX-4000 configurations.
-qos_exp <qosexpindex></qosexpindex>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when calls originating on this interface are routed through a PNNI network. See the QoSExpIndex field under conf qos show for this number.
-accelerated_clear	Accelerated remote call clearing allows signalling channels to react faster to failures reported by SONET equipment and on failures reported by VP-AIS OAM cells. disable means accelerated call clearing will not be performed on the signalling channel. Upon detection of a carrier loss, the switch waits until the SSCOP timer expires and then clears the calls in the establishment phase on this signalling channel. The active calls on this signalling channel take even longer to be cleared. enable means accelerated call clearing will be performed upon detection of a remote carrier loss. Depending on the hysteresis value (configured under conf port hysteresis), the switch tears down both active calls and calls in the establishment phase) within the 5 milliseconds default value or within the value set on this signalling channel. The default is disable. See Chapter 2 in this manual for information about the conf port hysteresis AMI command.
-cost	The cost (administrative weight) of this link that is used for determining the best route for this signalling channel in FT-PNNI.
-domain	The index number of the PNNI domain to which this signalling channel belongs. To find this number, look in the ID field under conf atmroute domain show.
-sscopnoresp_timer	The value to be set for the duration of the SSCOP no response timer. This is the time in seconds to wait before bringing the SSCOP connection down. This parameter can be set to a value higher than the default when the remote host is experiencing a heavy load and cannot process a signalling request in time. The default is 10 seconds for UNI 3.0 and 7 seconds for UNI 3.1.
-ilmireg	disable means no prefix registration messages are sent by the network-side, and no address registration messages are generated by the user-side. ignore means the network-side performs as it normally would, except that addresses registered are not published into the routing database. This is not recommended except in public network situations in which CPE2 equipment needs ILMI address registration in order to function correctly. The default is disable. This option may be used for signalling channels other than public UNIs (i.e., specifying automode or IISP above). However, for those signalling channels, ILMI registration is enabled by default (even though it is not an option to be specified here.) This means that ILMI address and prefix registration will occur across those signalling channels.

Parameter	Description
-addressformat	Indicates whether to use the native E.164 address format (used by public UNI) across this signalling channel or to use the private address format. If you specify e164, you can also specify a plantype. If you specify e164, the -type must be publicUNI. (If you specify private, the switch automatically uses the correct corresponding plantype.) For a list of the allowable combinations and more information, see the ATM Switch Network Configuration Manual.
-e164address	The native e164 address used by public UNI across this signalling channel.
-e164mapping	Indicates whether or not to resolve private NSAP addresses into native E.164 addresses. Enable means NSAP address-to-E.164 address mapping occurs. Disable means NSAP address-to-E.164 address mapping will not occur. However, if you use disable, but you are also using the native E.164 address format, then the only address conversion performed at this signalling channel is for private NSAP addresses in E.164 format.
-plantype (international national subscriber)	The plan type to be used in the calling party number and called party number information elements in the signalling messages. You can set this variable if the address format is specified as e164. You cannot set it if the address format is specified as private. By default, international is used with the e164 address format. By default, unknown is used with the private address format.
-iefilter (enable disable)	The information element (IE) filter which controls the filtering of signalling elements of the UNI 3.x signalling channels. Filters can be applied to the following UNI 3.x IEs: cg, cgs, cds, blli, blli23, bhli, aal. enable means that the listed elements will not be passed to the called party (they are filtered). Any IEs that are not listed here will be passed to the called party. When using this parameter with conf signalling new, filtering is enabled for any IEs that you specify. You can then later use this parameter with conf signalling modify to disable filtering of the specified IEs without changing the list.
cg	Filters the address of the calling party on calls going out on this interface.
cgs	Filters the subaddress of the calling party on calls coming in on this interface.
cds	Filters the subaddress of the called party on calls coming in on this interface.
blli	Filters all (first, second, and third) Broadband Low Layer Information (BLLI) IEs, which provides compatibility checking by an addressed entity on calls coming in on this interface. This information is transferred transparently between the calling and the called party.
blli23	Filters only the second and third Broadband Low Layer Information (BLLI) IEs on calls coming in and going out on this interface.
bhli	Filters the Broadband High Layer Information (BHLI), which provides compatibility checking by an addressed entity (e.g., a recipient of a call) on calls coming in on this interface.
aal	Filters the AAL (ATM Adaptation Layer) information on calls coming in and going out on this interface.

Signalling Commands

Parameter	Description
-defaultcpn (<nsapaddress> enable disable)</nsapaddress>	The default calling party number (CPN) to be inserted in an incoming call setup message, if the originator does not provide an address in the call setup request. Specifying an <nsapele <nsapele="" a="" address="" all="" an="" as="" be="" call="" can="" check="" condition.<="" cpn="" cpn.="" created="" default="" for="" has="" if="" incoming="" it="" means="" message="" messages="" of="" setup="" specifying="" td="" template="" that="" the="" this="" to="" treated="" used="" will="" without="" zeros.=""></nsapele>
-incomingfilter <filter-id> -none</filter-id>	<pre><filter-id> indicates the NSAP filter (from conf security nsapfilter filters show) to be applied to calls arriving at this signalling channel. You can remove this filter later by using conf signalling modify incomingfilter -none.</filter-id></pre>
-outgoingfilter <filter-id> -none</filter-id>	<pre><filter-id> indicates the NSAP filter (from conf security nsapfilter filters show) to be applied to calls leaving on this signalling channel. You can remove this filter later by using conf signalling modify outgoingfilter -none.</filter-id></pre>

9.4 Displaying Signalling Channels

This command allows you to list an individual switch fabric's current signalling channel information. Enter the following parameters:

```
myswitch::configuration signalling> show
Port VPI Interface
                        SigVersion State ILMI Side
                                                     RemoteAddress
       0 privateUNI(a) uni40(a) down down network
1A1
*1A2
       0 privateUNI(a) uni31(a) up
                                         uρ
                                             network 172.19.12.141
1A3
       0 privateUNI(a) uni31(a) down down network
 1A4
       0 privateUNI(a) uni30(a) down down network
1B1
       0 FT-PNNI(a)
                        uni31(a)
                                                     169.144.64.59
                                        up
                                             user
       0 privateUNI(a) uni30(a)
1B2
                                  down down network
1B3
       0 FT-PNNI(a)
                        uni40(a)
                                             network 172.19.12.58
 1B4
       0 privateUNI
                        uni30
                                        down network 172.19.12.139
       0 privateUNI
                        uni40
                                             network 172.19.12.142
 1C1
                                  up
1C2
       0 privateUNI
                        uni31
                                            network 172.19.12.140
                                  up
                                        up
       0 PNNI(a)
1C3
                        pnni10(a)
                                  up
                                        up
                                            network 172.19.12.57
       0 PNNI
                                            network 169.144.64.58
1C4
                        pnni10
       0 privateUNI(a) uni30(a)
                                         down network
 1CTL
                                   up
```

The fields are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled. An asterisk (*) to the left of the port number means that signalling channel is still being created and is not active yet. The control port on an <i>ASX</i> -4000 is displayed as 5CTL since it does not belong to a specific fabric.
VPI	The number of the virtual path that contains the signalling channel.
Interface	The operational type of the interface on this signalling channel. publicuni means that this signalling channel is operating between this switch and a public switch. privateuni means this signalling channel is operating between the switch and a host. IISP (Interim Inter-Switch Signalling Protocol) means this signalling channel is used between two switches. FT-PNNI is used between two switches using SPANS mapping messages for dynamic routing. PNNI means this signalling channel is using the PNNI protocol. (a) means that the switch is trying to automatically determine the appropriate interface type.
SigVersion	The version of the UNI or PNNI protocol being used at initialization. uni30 means that this link uses version 3.0 of the UNI protocol. uni31 means that this link uses version 3.1 of the UNI protocol. auto means that this link attempts to determine automatically which version of the UNI protocol to use. pnni10 means this link is an ATM Forum PNNI link. uni40 means that this link uses version 4.0 of the UNI protocol. (a) means that the switch is trying to automatically determine the protocol and version of that protocol that its peers are using.

Field	Description
State	The current state of the interface. If the state is up, this interface is operational. This is the normal state for a interface that is connected to another FORE Systems' ATM switch or host. If the state is down, this interface is not operational. This can be due to a lack of a physical connection or due to a software problem.
ILMI	Up means that ILMI is operational for this interface. Down means that ILMI is not operational for this interface.
Side	Shows if the switch is the user side or the network side on a given signalling channel. If the connection is to a host, network is displayed. If the connection is to another switch, one switch must be user and the other switch must be network.
RemoteAddress	The IP address of the remote endstation, if it is available.

To display information for all of the signalling channels on a specific port, (for example, port 1B1), enter the following parameters:

The fields in this display are defined in the same manner as those in the previous example.

To display information for all of the signalling channels on a specific port and path, (for example, port 1B1 and VPI 0), enter the following parameters:

The fields in this display are defined in the same manner as those in the previous example.

Additionally, there are several options you can use to show different types of information about the signalling channels.

```
myswitch::configuration signalling> show [<port> [<vpi>]]
[atm | atmranges | protocol | atmroute | timers | public | iefilter | nsapfilter ]
```

These options are described in the following subsections.

9.4.1 Displaying ATM Layer Information for Signalling Channels

To show ATM layer information about all of the signalling channels on a switch fabric, enter the following parameters:

myswitch::configuration signalling> show atm										
VpciGroupId	OutSigUpc	InSigUpc	ILMIVCI	SigVCI	VPI	Port				
	N/A	0	16	5	0	4D1				
101	N/A	0	16	5	0	4D2				
301	N/A	0	16	5	0	4D3				
	N/A	0	16	5	0	4D4				
	N/A	0	16	5	0	4E1				
	N/A	0	16	5	0	4E2				
	N/A	0	16	5	0	4E3				
	N/A	0	16	5	0	4CTL				

The fields are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
SigVCI	The VCI on the signalling channel. The default reserved VCI is 5.
ILMIVCI	The VCI to be used for ILMI signalling messages. The default reserved VCI is 16.
InSigUpc	The index number of the UPC traffic contract that is applied to the input signalling channel. UPC contracts can be displayed using conf upc show.
OutSigUpc	The index number of the UPC traffic contract that is applied to the output signalling channel. UPC contracts can be displayed using conf upc show. N/A indicates that the output signalling channel is not tied to any UPC index.
VpciGroupId	The VPCI group index applied to the signalling channel.

To list ATM information for all of the signalling channels on a specific port and path, (for example, port 4D3 and VPI 0), enter the following parameters:

	0 atm	> show 4d3	signalling:	uration	configu	ch:	myswi
VpciGroupId		OutSigUpc	InSigUpc	ILMIVCI	SigVCI	VPI	Port
301		N/A	0	16	5	0	4D3

9.4.2 Displaying ATM Range Information for Signalling Channels

To show ATM range information about all of the signalling channels on a switch fabric, enter the following parameters:

		Admin	Admin	Oper	Oper	Admin	Oper	Oper	
Port	VPI	MinVCI	MaxVCI	MinVCI	MaxVCI	MaxVPI	MaxSvccVPI	MaxSvpcVPI	SvpCapable
4D1	0	32	511	32	511	1022	N/A	N/A	N/A
4D2	0	32	511	32	511	1022	N/A	N/A	N/A
4D3	0	32	511	32	511	1022	N/A	N/A	N/A
4D4	0	32	511	32	511	1022	N/A	N/A	N/A
4E1	0	32	7168	32	7167	1023	N/A	1023	TRUE
4E2	0	32	7168	32	7167	1023	N/A	1023	TRUE
4E3	0	32	7168	32	7167	1023	N/A	1023	TRUE
4CTL	0	32	1023	32	1023	0	N/A	N/A	N/A

The fields in the ATM display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
Admin MinVCI	The user-requested bottom number for the range of VCIs to be reserved for UNI SVCs on this path. If no value is entered, the default is 32.
Admin MaxVCI	The user-requested top number for the range of VCIs to be reserved for UNI SVCs on this path. If no value is entered, the default is the maximum number of VCIs on the containing path.
Oper MinVCI	The actual (operational) bottom number for the range of VCIs to be reserved for UNI SVCs on this path. A value that is displayed in brackets indicates that negotiation of this value with the UNI peer via ILMI is not complete because either ILMI is not up, or if ILMI is up, the negotiation is still in progress. A value that is displayed without brackets indicates the value has been successfully negotiated (if ILMI is enabled and up) or negotiation did not need to take place (if ILMI is disabled). For more information, see the <i>ATM Switch Network Configuration Manual</i> .
Oper MaxVCI	The actual (operational) top number for the range of VCIs to be reserved for UNI SVCs on this path. A value that is displayed in brackets indicates that negotiation of this value with the UNI peer via ILMI is not complete because either ILMI is not up, or if ILMI is up, the negotiation is still in progress. A value that is displayed without brackets indicates the value has been successfully negotiated (if ILMI is enabled and up) or negotiation did not need to take place (if ILMI is disabled). For more information, see the <i>ATM Switch Network Configuration Manual</i> .
Admin MaxVPI	The user-requested maximum VPI value that is allocated for a Switched Virtual Paths (SVP) and for the switched portion of Smart Permanent Virtual Path Connections (SPVPs).

Field	Description
Oper MaxSvccVPI	The actual (operational) maximum VPI value to be used for dynamic paths that are created for setting up SVCs. The VPI range used for allocating SVCs is from 1 to this number.
Oper MaxSvpcVPI	The actual (operational) maximum VPI value to be used for dynamic paths that are created for setting up SVPs. The VPI range used for allocating SVPs is from 1 to this number.
SvpCapable	TRUE indicates that SVPs are supported on this signalling interface. N/A indicates that SVPs are not supported on this signalling interface.

To list ATM range information for all of the signalling channels on a specific port and path, (for example, port 4D3 and VPI 0), enter the following parameters:

	myswitch::configuration signalling> show 4d3 0 atmranges								
	Oper	Oper	Admin	Oper	Oper	Admin	Admin		
SvpCapable	MaxSvpcVPI	MaxSvccVPI	MaxVPI	MaxVCI	MinVCI	MaxVCI	MinVCI	VPI	Port
N/A	N/A	N/A	1022	511	32	511	32	0	4D3

The fields in this display are defined in the same manner as those in the previous example.

9.4.3 Displaying Protocol Information for Signalling Channels

To show protocol information about all of the signalling channels on a switch fabric, enter the following parameters:

L	HYSWIL	CII··C	onriguration	signalling snow	prococor	
			Allocation			
	Port	VPI	Scope	Mode	QoSExpIndex	${\tt AcceleratedClear}$
	1A1	0	VP(a)	Non-Associated(a) 0	disable
	1A2	0	VP(a)	Non-Associated(a) 0	enable
	1A3	0	VP(a)	Non-Associated(a) 0	disable
	1A4	0	VP(a)	Non-Associated(a) 0	disable
	1CTL	0	VP(a)	Non-Associated(a) 0	disable

muguitah: gonfiguration gignallings ghow protogol

The fields in the protocol display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
Allocation Scope	The allocation policy for a network side signalling channel. If set to vp, the network side signalling channel allocates connections in its containing VP only. If set to link, the signalling channel allocates connections in its containing VP and may allocate connections in other VPs in the range 0 to 255 that are available to it. The link option is only available for UNIs on VP 0. The default is vp for FT-PNNI and link for PNNI.
Mode	The mode to be used for signalling. If set to nonAssoc (Non-associated signalling), the signalling channel encodes the connection identifier with Non-associated signalling bits. If set to vpAssoc (VP-associated signalling), the signalling channel encodes the connection identifier with the VP-associated signalling bits. The default is nonAssoc for FT-PNNI and vpAssoc for PNNI, except VP 0 which must be nonAssoc.
QosExpIndex	The index number of the set of QoS expansion entries. See the QosExpIndex field under conf qos show for this number. For call set-up messages that originate on this signalling channel and are routed through a PNNI network, these entries are used to perform the QoS expansion procedures. For more information, see the ATM Forum PNNI Specification. A value of 0 means that the default QoS expansion entries will be used.
AcceleratedClear	This displays whether the signalling channel has been configured for accelerated remote call clearing. Accelerated call clearing allows signalling channels to react faster to failures reported by SONET equipment and on failures reported by VP-AIS OAM cells. disable means accelerated call clearing will not be performed on the signalling channel. Upon detection of a carrier loss, the switch waits until the SSCOP timer expires and then clears the calls in the establishment phase on this signalling channel. The active calls on this signalling channel take even longer to be cleared. enable means accelerated call clearing will be performed upon detection of a remote carrier loss. Depending on the hysteresis value (configured under conf port hysteresis), the switch tears down both active calls and calls in the establishment phase) within the 5 milliseconds default value or within the value set on this signalling channel. The default is disable.

To display protocol information for all of the signalling channels on a specific port and path, (for example, port 4B3 and VPI 2), enter the following parameters:

9.4.4 Displaying ATM Routing Information for Signalling Channels

To show ATM routing information about all of the signalling channels on a switch fabric, enter the following parameters:

myswit	ch:	configura	ation s	ign	alling>	show	atmroute
Port	VPI	OrigCost	TermCo	st	Domain	Noc	le
1A1	0	100		0	1	N/	A
1A2	0	100		0	1	N/	A
1A3	0	100		0	1	N/	A
1A4	0	100		0	1	N/	A
1A5	0	100		0	1	N/	A
1A6	0	100		0	1	N/	A
1C1	0	100		0	1	N/	A
1C2	0	100		0	1	N/	A
1C3	0	100		0	1	N/	A
1C4	0	100		0	1	N/	A
1CTL	0	100		0	1	N/	A

The fields in the routing display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
OrigCost	The cost of each FT-PNNI link configured at the originating end of the signalling channel.
TermCost	The cost of each FT-PNNI link configured at the terminating end of the signalling channel.
Domain	The index number of the PNNI domain to which this signalling channel belongs.
Node	The operational node index number to which this signalling channel belongs. This field only applies to PNNI interfaces.

To display ATM routing information for all of the signalling channels on a specific port and path, (for example, port 1A4 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1a4 0 atmroute
Port VPI OrigCost TermCost Domain Node
1A4 0 100 0 1 N/A
```

9.4.5 Displaying Timer Information for Signalling Channels

To show timer information about all of the signalling channels on a switch fabric, enter the following parameters:

ľ	myswit	ch:	configuration	signalling>	show	timers
	Port	VPI	SscopNoRespons	se		
	1A1	0	=	10		
	1A2	0	=	10		
	1A3	0		7		
	1A4	0	=	10		
	1B1	0		7		
	1B2	0	=	10		
	1B3	0	=	10		
	1B4	0		7		
	1CTL	0	- -	10		

The fields in the timer display are defined as follows:

Field	Description	
Port	The port numbers that currently have a signalling interface enabled.	
VPI	The number of the virtual path that contains the signalling channel.	
SScopNoResponse	The value that has been set for the duration of the SSCOP no response timer. This is the time in seconds to wait before bringing the SSCOP connection down. The default value is 10 seconds for UNI 3.0 and 7 seconds for UNI 3.1.	

To display timer information for all of the signalling channels on a specific port and path, (for example, port 1A3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1A3 0 timers
Port VPI SscopNoResponse
1A3 0 7
```

9.4.6 Displaying Public UNI Information for Signalling Channels

To show public UNI information about all of the signalling channels on a switch fabric, enter the following parameters:

myswitch::configuration signalling> show public

			El64Address	
Port	VPI ILMIReg	AddressFmt E164Address	Resolution	PlanType
1B1	0 disable	E.164	enable	international
1B2	0 disable	E.164	enable	national
1B3	0 enable	private	disable	unknown
1B4	0 disable	E.164	enable	subscriber
1CTL	0 enable	private	disable	unknown

The fields in the public display are defined as follows:

Field	Description	
Port	The port numbers that currently have a signalling interface enabled.	
VPI	The number of the virtual path that contains the signalling channel.	
ILMIReg	Shows whether ILMI address and prefix registration occur across this signalling channel. Enable means that ILMI address and prefix registration occur across this signalling channel. If enable is displayed, then this is not a public UNI. Disable means that no prefix registration messages are sent by the network-side, and no address registration messages are generated by the user-side. Ignore means that the network-side performs as it normally would, except that addresses registered are not published into the routing database. This setting is not recommended except in public network situations in which CPE equipment needs ILMI address registration in order to function correctly.	
AddressFmt	Shows if the native e164 (used by public UNI) address format or if the private address format is being used across this link.	
E164 Address	Shows the native e164 address assigned to this link.	
E164 Address Resolution	Shows whether or not to resolve private NSAP addresses into native E.164 addresses. Enable means that NSAP address-to-E.164 address mapping occurs. Disable means that NSAP address-to-E.164 address mapping does not occur. However, if you use disable, but you are also using the native E.164 address format, then the only address conversion performed at this signalling channel is for private NSAP addresses in E.164 format.	
PlanType	Shows the plan type used in the calling party number and called party number information elements in the signalling messages. By default, <code>international</code> is used with the <code>e164</code> address format. This value can be specified for <code>e164</code> . By default, <code>unknown</code> is used with the <code>private</code> address format. This value cannot be modified for <code>private</code> .	

Signalling Commands

To display public information for all of the signalling channels on a specific port and path, (for example, port 1b2 and $VPI\ 0$), enter the following parameters:

```
myswitch::configuration signalling> show 1b2 0 public

E164Address

Port VPI ILMIReg AddressFmt E164Address Resolution PlanType

1B2 0 disable E.164 enable national
```

9.4.7 Displaying IE Filter Information for Signalling Channels

To show IE filter (information element filter) information about all of the signalling channels on a switch fabric, enter the following parameters:

The fields in the iefilter display are defined as follows:

Field	Description
Port	The port number of the signalling channel to which the IE filters apply.
VPI	The virtual path number that contains the signalling channel to which the IE filters apply.
IEFilter	Shows whether or not the information element (IE) filter has been enabled. Filters can be applied to the following IEs: cg, cgs, cds, blli, blli23, bhli, aal. enabled means that the IEs listed with a - will not be passed to the called party (they are filtered) and the IEs listed with a + will be passed to the called party. disabled means that no IEs are filtered (all are passed), despite the + or -; i.e., the filtering feature is turned off.
CG	Filters on the address of the call originating entity.
CGS	Filters on the subaddress of the call originating entity.
CDS	Filters on the subaddress of the called party.
BHLI	Filters on the Broadband High Layer Information (BHLI), which provides compatibility checking by an addressed entity (e.g., a recipient of a call).
BLLI	Filters on all (first, second, and third) Broadband Low Layer Information (BLLI) IEs, which provides compatibility checking by an addressed entity. This information is normally transferred transparently between the call originator and the call recipient.
BLLI23	Filters on only the second and third Broadband Low Layer Information (BLLI) IEs.
AAL	Filters on the AAL (ATM Adaptation Layer) information.
Default Calling Address	enabled means that the default calling party number (CPN) shown in the display is inserted if one has not been provided. disabled means that no default CPN is inserted if one has not been provided. If a default CPN is not supplied, an incoming call setup message without a CPN is treated as if it has a CPN of all zeros.

To display iefilter information for all of the signalling channels on a specific port and path, (for example, port 1B3 and VPI 0), enter the following parameters:

The fields in this display are defined in the same manner as those in the previous example.

9.4.8 Displaying NSAP Filter Information for Signalling Channels

To show NSAP filter information about all of the signalling channels on a switch fabric, enter the following parameters:

The fields in the nsapfilter display are defined as follows:

Field	Description	
Port	The port number of the signalling channel to which the filter applies.	
VPI	The virtual path number of the signalling channel to which the filter applies.	
Incoming Filter ID	The unique index number or name that identifies this incoming filter. See the Index and Name fields under conf security nsapfilter show.	
Outgoing Filter ID	The unique index number or name that identifies this outgoing filter. See the Index and Name fields under conf security nsapfilter show.	

To display NSAP filter information for all of the signalling channels on a specific port and path, (for example, port 1B4 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1B4 0 nsapfilter
Port VPI Incoming Filter ID Outgoing Filter ID
1B4 0 keep_them_out 68
```

9.5 VPCI Mapping Table Commands

Multiple VPCI-VPI-port mappings for a single virtual UNI signalling interface can be created. The VPCI mapping table (referred to as VMT) contains the necessary information for a single VPCI-VPI-port mapping where each entry in the VMT is assigned a unique map index. The VPCI mapping group table contains a listing of all map indices where each entry in the VPCI group table is assigned a unique group index. The group index can refer to more than one map index for multiple VPCI-VPI-port mappings. This group index is used to create a signalling interface.

The commands listed under **vpcitable** allow you to manage the map and group tables. Type? at the **vpcitable** level to display the list of available subcommands.

This section only describes the VPCI mapping table and VPCI mapping group table commands for virtual UNIs. For more information on how virtual UNIs are used, see Chapter 7 in the *ATM Switch Network Configuration Manual*.



Disable all debug tracing on the switch while using a large number of private UNI signalling interfaces.

9.5.1 Managing VPCI Mapping Group Table Entries

These commands let you manage the entries in the VPCI mapping group table. Type ? at the vpcigroup level to display the list of available subcommands.

9.5.1.1 Displaying the VPCI Mapping Group Entries

This command lets you display all VPCI group indices and the VPCI map indices that are associated with a particular VPCI group entry. Enter the following:

myswitch::configuration signalling vpcitable vpcigroup> show

VPCIgroup-id	VPCImap-IDs
101	10
102	11
103	12
301	30 31 32
501	50 51 52 53

To display the VPCI-VPI-port mappings for a particular group entry, enter the following:

```
myswitch::configuration signalling vpcitable vpcigroup> show [<vpcigroup-index>]
[-mapping]
myswitch::configuration signalling vpcitable vpcigroup> show 101 -mapping

VPCIgroup-id VPCImap-id VPCI VPI Port
101 10 0 THIS_VPI THIS_PORT
```

The fields are defined as follows:

Field	Description	
VPCIgroup-id	The VPCI group index.	
VPCImap-id	The VPCI map indices associated with this group.	
VPCI	The virtual path connection identifier used for signalling the connection.	
VPI	The virtual path identifier used for the connection. THIS_VPI means that the VPI is the same as the VPI associated with the signalling interface.	
Port	The port used for the connection. THIS_PORT means that the port is the same as the port associated with the signalling interface.	

9.5.1.2 Creating a New VPCI Mapping Group Entry

This command lets you create a new VPCI group. Enter the following:

```
myswitch::configuration signalling vpcitable vpcigroup> new <vpcigroup-index>
<vpcimap-index> [<vpcimap-index>]*
```

The parameters are defined as follows::

Parameter	Description
vpcigroup-index	The VPCI group index that you want to assign to this entry.
vpcimap-index	The VPCI map index containing the VPCI-VPI-port mapping you want for the VPCI group. Multiple VPCI map indices can be specified.

For example, enter the following:

```
myswitch::configuration signalling vpcitable vpcigroup> new 103 12 myswitch::configuration signalling vpcitable vpcigroup> new 301 30 31 32
```

Use the **show** command to display the group entries created:

Use the **show-mapping** command to display the VPCI-VCI-Port mappings for the group created:

myswitch::configuration signalling vpcitable vpcigroup> show -mapping					
	VPCIgroup-id	VPCImap-id	VCI	VPI	Port
	103	12	10	40	4C8
	301	30	20	50	THIS_PORT
		31	21	51	THIS_PORT
		32	22	52	THIS PORT

9.5.1.3 Adding a VPCI Map Index to an Existing VPCI Mapping Group

This command lets you add map indices (containing the VPCI-VPI-port mappings you want) to an existing VPCI mapping group.



This command can only be used if the group entry is not in use by any signalling interface. If a particular group index is in use by a signalling interface, the VPCI map index cannot be added.

myswitch::configuration signalling vpcitable vpcigroup> add <vpcigroup-index>
<vpcimap-index> [<vpcimap-index>]*

For example, enter the following:

```
myswitch::configuration signalling vpcitable vpcigroup> add 301 33
```

Use the **show** command to display the VPCI map index you added:

9.5.1.4 Deleting a VPCI Mapping Group

This command lets you delete a VPCI mapping group or delete a map index from a group. Enter the following:

myswitch::configuration signalling vpcitable vpcigroup> delete <vpcigroup-index>
[<vpcimap-index>]*



Specifying a VPCI map index removes only that VPCI map index from the VPCI group if the VPCI group index is not in use by any signalling interface. If a particular VPCI group index is in use by a signalling interface, the VPCI group index cannot be deleted or modified.

For example, enter the following:

myswitch::configuration signalling vpcitable vpcigroup> delete 301 34

9.5.2 Managing VPCI Map Table Entries

These commands let you manage the VPCI-VPI-port mappings in the VMT. Type ? at the **vpcimap** level to display the list of available subcommands.

9.5.2.1 Deleting a VPCI Map Index

This command lets you delete a specific VPCI map entry. Enter the following:

```
myswitch::configuration signalling vpcitable vpcimap> delete <vpcimap-index>
```



If a VPCI map index is in use by a VPCI group index, the VPCI map index cannot be deleted.

9.5.2.2 Creating a New VPCI Map Index

This command lets you create a new VPCI-VPI-port mapping for a new map index. Enter the following:

```
myswitch::configuration signalling vpcitable vpcimap> new <vpcimap-index>
[-vpci <vpci>] [-vpi <vpi>] [-port <port>]
```

For example, enter the following:

```
myswitch::configuration signalling vpcitable vpcimap> new 10
myswitch::configuration signalling vpcitable vpcimap> new 11 -vpci 2 -vpi 3
myswitch::configuration signalling vpcitable vpcimap> new 12 -vpci 10 -port 4C8
myswitch::configuration signalling vpcitable vpcimap> new 30 -vpci 20 -vpi 50 -port 1A1
```

The parameters are defined as follows:

Field	Description
VPCImap-index	The VPCI map index assigned to this VPCI-VPI-port mapping. Multiple VPCI map indices can be specified.

Signalling Commands

Field	Description
VPCI	The virtual path connection identifier used for signalling the connection. The default is $\ensuremath{\text{VPCI=0}}$
VPI	The virtual path identifier used for the connection. The default is <code>THIS_VPI</code> which means that the VPI is the same as the VPI associated with the signalling interface.
Port	The port used for the connection. The default is <code>THIS_PORT</code> which means that the port is the same as the port associated with the signalling interface.

Use the ${ t show}$ command to display the VPCI-VPI-port mappings for the map indexes:

myswitch::configuration	signalling	vpcitable vpcimap>	show	
VPCImap-id	VPCI	VPI		Port
10	0	THIS_VPI		THIS_PORT
11	2	3		THIS_PORT
12	10	THIS_VPI		4C8
30	20	50		1A1

9.5.2.3 Displaying VPCI-VPI-Port Mappings

This command lets you display the map indices and their VPCI-VPI-port mappings. Enter the following:

myswitch::configuration	signalling	vpcitable vpcimap>	<pre>show [<vpcimap-index>]</vpcimap-index></pre>
VPCImap-id	VPCI	VPI	Port
10	0	THIS_VPI	THIS_PORT
11	2	3	THIS_PORT
12	10	40	4C8
30	20	50	THIS_PORT
31	21	51	THIS_PORT
32	22	52	THIS_PORT
50	5	30	1A1
51	6	31	1A1
52	7	30	1D1
53	8	31	1D1

The fields are defined as follows:

Field	Description
VPCImap-id	The VPCI map indices associated with this group.
VPCI	The virtual path connection identifier used for signalling the connection.
VPI	The virtual path identifier used for the connection. THIS_VPI means that the VPI is the same as the VPI associated with the signalling interface.
Port	The port used for the connection. THIS_PORT means that the port is the same as the port associated with the signalling interface.

To display the VPCI-VPI-port mapping for a specific map index, enter the following:

$\verb myswitch::configuration \\$	signalling	vpcitable	vpcimap>	show 1	0
VPCImap-id	VPCI		VPI		Port
10	0	TH	IS_VPI		THIS_PORT

Signalling Commands

CHAPTER 10 SNMP Configuration Commands

These commands enable you to manage the SNMP communities and traps. You can display the list of available subcommands by typing? at the snmp level.

10.1 Configuring the SNMP Community Access

This command lets you modify the SNMP community access to the switch. Enter the following:

```
myswitch::configuration snmp> community (read | write) <community>
```

These parameters are defined as follows:

Parameter	Description
read write	read sets the community string for SNMP read operations (get and getnext requests). write sets the community string for SNMP write operations (set requests).
community	The community string associated with read or with write. The default string associated with read is public. The default string associated with write is private.



Even if you are not using SNMP management, it is highly recommended that you change the default community strings for security purposes.

10.2 Enabling or Disabling SNMP SETs

This command lets you enable or disable SNMP SET operations from the network. Enter the following parameters:

```
myswitch::configuration snmp> sets (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	SNMP set requests from remote management stations are accepted. This is the default. This variable can be set only by a user with admin privileges.
disable	SNMP set requests from remote management stations are ignored.

10.3 Displaying SNMP SET Information

This command shows you if SNMP SETs from the network are currently enabled or disabled. Enter the following parameters:

```
myswitch::configuration snmp> show
SET operations from network are enabled
```

10.4 Configuring SNMP Traps

These commands help you to manage SNMP traps. You can display the list of available sub-commands by typing? at the trap level.

```
myswitch::configuration snmp trap> ?
  destinations> log>
```

10.4.1 Configuring Trap Destinations

These commands help you to configure SNMP trap destinations. You can display the list of available subcommands by typing? at the destinations level.

10.4.1.1 Deleting a Trap Destination

This command lets you delete an SNMP trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> delete <trap>
```

This parameter is defined as follows:

Parameter	Description
trap	Indicates the index number of the trap that you want to delete. Use the conf snmp trap destinations show command and look at the Trap field to find this number.

10.4.1.2 Creating a Trap Destination

This command lets you add an SNMP trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> new <ipaddress>
```

This parameter is defined as follows:

Parameter	Description
ipaddress	The IP address of the SNMP trap destination that you want to add.

10.4.1.3 Displaying Trap Destination Information

This command lets you display all of the existing SNMP trap destinations. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> show
Trap    Destination
1    169.144.28.33
2    169.129.45.90
```

If no trap destinations have been configured, then the following is displayed:

```
myswitch::configuration snmp trap destinations> show
No trap information is available
```

10.4.2 Configuring the SNMP Trap Log

These commands let you configure the SNMP trap log. You can display the list of available subcommands by typing ? at the log level.

```
myswitch::configuration snmp trap log> ?
show threshold>
```

10.4.2.1 Displaying the SNMP Trap Log

This command lets you display the log of the SNMP traps that occurred. Enter the following parameters:

myswitch::configuration snmp trap log> show							
Index	Trap	Xmits	LastXmit	Events	LastEvent		
			(time elapsed)		(time elapsed)		
1	trap_warmStart	1	2 days 20:59	1	2 days 20:59		
2	asxLinkDown	1	2 days 20:59	1	2 days 20:59		
3	asxSonetLOSDetected	1	2 days 20:59	1	2 days 20:59		
4	asxLinkDown	1	2 days 20:59	1	2 days 20:59		
5	asxSonetLOFDetected	1	2 days 20:59	1	2 days 20:59		
6	asxLinkDown	1	2 days 20:59	1	2 days 20:59		
7	asxDS3LOSDetected	1	2 days 20:59	1	2 days 20:59		
8	asxLinkDown	1	2 days 20:59	1	2 days 20:59		
9	asxDS3LOSDetected	1	2 days 20:59	1	2 days 20:59		
10	asxHostLinkUp	1	2 days 20:59	1	2 days 20:59		
11	asxSpansUp	1	2 days 20:59	1	2 days 20:59		
12	asxHostLinkUp	1	2 days 20:59	1	2 days 20:59		
13	asxSpansUp	1	2 days 20:59	1	2 days 20:59		
14	asxHostLinkUp	1	2 days 20:59	1	2 days 20:59		
15	asxSpansUp	1	2 days 20:59	1	2 days 20:59		
16	asxTempSensorRegularTemp	1	2 days 20:59	1	2 days 20:59		
17	asxPsOutputUp	1	2 days 20:59	1	2 days 20:59		
18	asxPsInputUp	1	2 days 20:59	1	2 days 20:59		
19	asxSwitchLoginDetected	5	0 days 00:00	5	0 days 00:00		

The fields in this display are defined as follows:

Field	Description
Index	Shows the index number of this trap.
Trap	Shows the name of this trap.
Xmits	Shows how many times this trap was transmitted to the trap destination.
LastXmit	Shows when this trap was last transmitted; i.e., how long ago it was transmitted.
Events	Shows how many times this trap actually occurred on the switch.
LastEvent	Shows how long ago this trap last occurred. (The first occurrence is always transmitted. After that, transmissions are determined by the threshold and time period.)

SNMP Configuration Commands

You can also display information about an individual trap as follows:

To display even more details about a trap occurrence, including the specific port number on which these traps occurred, use the **variables** option as follows:

```
myswitch::configuration snmp trap log> show variables
No Trap Variables for LogIndex: 1 Trap: trap_warmStart
LogIndex: 2 Trap: asxLinkDown
Variable
                            Value
_____
hwPortName
hwPortBoard
                           0
hwPortModule
                            1
hwPortNumber
LogIndex: 3 Trap: asxSonetLOSDetected
Variable
hwPortName
                            1B3
hwPortBoard
                            0
hwPortModule
                           1
hwPortNumber
LogIndex: 4 Trap: asxLinkDown
Variable
                           Value
Press return for more, q to quit: q
```

10.4.2.2 Configuring the Trap Log Threshold

These commands let you configure the SNMP trap log threshold. You can display the list of available subcommands by typing? at the threshold level.

```
myswitch::configuration snmp trap log threshold> ?
modify reset show
```

10.4.2.2.1 Modifying the Trap Log Threshold

This command lets you specify the threshold and time period for sending traps to the trap destination or to a management station. The first occurrence of a trap is always transmitted. After that, if the number of occurrences of that trap exceeds the specified threshold, or if the time lag between two occurrences of that trap is greater than the specified time period, the latest trap gets transmitted out to the trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> modify <index>
[-thresh <value>] [-time <seconds>]
```

These parameters are defined as follows:

Parameter	Description
index	The index number of the trap whose threshold you want to modify.
-thresh <value></value>	If the number of occurrences of a given trap since the first occurrence of the trap exceeds this number, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent. The default is 1. The lowest acceptable value is 1. The upper limit is the size of an integer.
-time <seconds></seconds>	If the amount of time between two consecutive occurrences of a given trap exceeds this number, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent. The default is 1 second. The lowest acceptable value is 1 second. There is no upper limit.

10.4.2.2.2 Resetting the Trap Log Threshold

This command lets you reset the threshold and time period for sending traps to the trap destination or to a management station. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> {\bf reset} Reset all trap thresholds to defaults [n]? {\bf n}
```

Entering $\bf n$ or pressing **<enter>** aborts the command. Entering $\bf y$ resets the threshold and time period.

10.4.2.2.3 Displaying the Trap Log Threshold

This command lets you display the threshold and time period for sending traps to the trap destination or to a management station. Enter the following parameters:

myswi	myswitch::configuration snmp trap log threshold> show						
Index	Trap	Threshold	TimePeriod				
1	asxSwLinkDown	1	1				
2	asxSwLinkUp	1	1				
3	asxHostLinkDown	1	1				
4	asxHostLinkUp	1	1				
5	asxNetModuleDown	1	1				
6	asxNetModuleUp	1	1				
7	asxPsInputDown	1	1				
8	asxPsInputUp	1	1				
9	asxPsOutputDown	1	1				
10	asxPs0utputUp	1	1				
11	asxFanBankDown	1	1				
12	asxFanBankUp	1	1				
Press	return for more, a to quit: a						

The fields in this display are defined as follows:

Field	Description
Index	The index number of the trap.
Trap	The name of the trap.
Threshold	If the number of occurrences of a given trap exceeds the threshold number shown, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent.
TimePeriod	If the amount of time between two consecutive occurrences of a given trap exceeds the time period number shown, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent.

You can also display the threshold and time period for a specific trap as follows:

CHAPTER 11 SPANS Configuration

Commands

These commands allow you to manage SPANS (Simple Protocol for ATM Network Signalling), FORE Systems' pre-standard signalling protocol. Type? at the spans level to display the list of available commands.

myswitch::configuration spans> ? delete show



SPANS is not completely decoupled from FT-PNNI. The SPANS VCC is still used for FT-PNNI routing information. Therefore, all non ASX-4000 switch platforms connected to an ASX-4000 via FT-PNNI links must be configured with a SPANS VCC that uses AAL5, even if the SPANS interface is not being utilized.

11.1 Deleting a SPANS Signalling Path

This command lets you delete an existing SPANS signalling path. Enter the following:

```
myswitch::configuration spans> delete <port> <vpi>
```

ForeThought PNNI (FT-PNNI) uses the SPANS reserved signalling channel (VCI 15) for exchanging its routing information. In the previous releases of ForeThought software, when SPANS was deleted on a path, the SPANS signalling channel (VCI 15) was also deleted. This resulted in FT-PNNI routing going down. In ForeThought 5.0.x software, the SPANS signalling channel (VCI 15) is deleted on a path only when both SPANS and FT-PNNI are deleted on it.

Therefore, even if SPANS is deleted, as long as FT-PNNI is active, the SPANS signalling channel is kept alive by sending and receiving SPANS status messages on it. So, FT-PNNI could remain active even if SPANS is deleted. The SPANS module on the other side of the link is not aware of SPANS going down on the link (because it still keeps receiving status messages on it).



The SPANS topology will have only one unidirectional link from the switch on which SPANS is deleted to the switch on which SPANS is active. The other unidirectional link does not exist. Therefore, no one will be able to ping the switch on which SPANS is deleted.

11.2 Creating a SPANS Signalling Path

This command allows you to create a SPANS signalling path.



Before a SPANS signalling path can be created on a given VPI, an originating and a terminating path must exist for that same VPI.

Enter the following parameters:

```
myswitch::configuration spans> new <port> <vpi> [-cdvt <cdvt>] [(tag | drop)]
advanced options:
    [-sig <vci>] [-cls <vci>] [-aal (4 | 5 | auto)]
    [-sigbw <Kbps>] [-clsupc <index>]
    [-minvci <vci>] [-maxvci <vci>]
    [-opentimeout <msec>] [-closetimeout <msec>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number on which the SPANS signalling path exists.
vpi	The number of the SPANS path.
cdvt	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds.
tag drop	tag means that non-compliant cells are tagged. drop means that non-compliant cells are dropped.
-sig <vci></vci>	The VCI to use for SPANS signalling messages. The default is 15.
-cls <vci></vci>	The VCI to use for connectionless messages. The default is 14.
-aal	The AAL type to use for this SPANS signalling path. Can be 4, 5, or auto. The default is 4.
sigbw	The amount of bandwidth, in Kbps, to be reserved on the VCI for SPANS signalling messages. The default is 385 Kbps.
-clsupc <index></index>	The integer index that refers to a specific traffic contract that is used to police the connectionless VCI. If no index is specified, no traffic policing will take place on this VCI. It is assigned a UPC index of 0, and all traffic on this VCI is treated as UBR traffic. This is the default.

Parameter	Description
-minvci <vci></vci>	The bottom number for the range of VCIs to be reserved for SPANS SVCs on this path. The default is 32. You can change this range if you want to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs.
-maxvci <vci></vci>	The top number for the range of VCIs to be reserved for SPANS SVCs on this path. The default is the maximum number of VCIs that the path supports. You can change this range if you want to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs.
-opentimeout	The timeout for SPANS open requests. This option should be used on links that have a high propagation delay, such as satellite links. The default is 300 msec.
-closetimeout	The timeout for SPANS close requests. This option should be used on links that have a high propagation delay, such as satellite links. The default is 500 msec.

The following is an example of how to configure SPANS to use only VCIs 32-100 on port 1A1, VPI 0:

configuration spans> new lal 0 -minvci 32 -maxvci 100



ForeThought software provides support for older protocols including ForeThought PNNI and SPANS signalling. The ASX-4000 and the ESX-3000 use AAL5 encapsulation for these protocols. Other FORE switches, instead, use AAL 3/4 encapsulation by default. If you are running these older protocols on an ASX-4000 or an ESX-3000, you must statically configure any other FORE switches to use AAL 5 encapsulation on their connections to the ASX-4000 or the ESX-3000. To statically configure these connections, use conf spans delete and conf spans new <port> <vpi> -aal 5.

11.3 Showing the SPANS Signalling Path Configuration

This command lets you list an individual switch fabric's current SPANS signalling path information. Enter the following parameters:

myswit	ch::cc	onfigui	ration	spans>	show	
Port	VPI	State	Type	CDVT	Action	RemoteAddress
4D1	0	up	uni	250	drop	172.19.8.134
4D2	0	up	uni	250	drop	172.19.8.142
4D3	0	down	uni	250	drop	
4D4	0	down	uni	250	drop	
4E1	0	up	nni	100	drop	
4E2	0	up	nni	100	drop	
4E3	0	up	nni	100	drop	
4CTL	0	up	uni	0	drop	172.19.8.29

The fields in this display are defined as follows:

Field	Description
Port	The port number of the SPANS signalling path.
VPI	The virtual path number of the SPANS signalling path.
State	The current state of the SPANS path. If the state is \mathtt{up} , this path is operational. If the state is \mathtt{down} , this interface is not operational.
Туре	The type of connection on this SPANS path. If the type listed is uni, this is a SPANS user-to-network interface connection to a SPANS host. If the type listed is nni, then this is a SPANS network-to-network interface connection to another switch.
CDVT	The Cell Delay Variation Tolerance (CDVT), in microseconds.
Action	Tag means that non-compliant cells are tagged. Drop means that non-compliant cells are discarded.
Remote Address	The IP address of the remote endstation, if it is available.

SPANS Configuration Commands

4E1

4E2

4CTL

To show advanced SPANS signalling path information about all of the ports, enter the following parameters:

myswit	ch::	configu	ration	span	s> show	advanc	ed				
Port	VPI	SigVCI	CLSVCI	AAL	MinVCI	MaxVCI	SigBW	CLSUPC	OpenT/O	CloseT/O	OutServ
4D1	0	15	14	4	32	511	385	0	300	500	vbr
4D2	0	15	14	4	32	511	385	0	300	500	vbr
4D3	0	15	14	4	32	511	385	0	300	500	vbr
4D4	0	15	14	4	32	511	385	0	300	500	vbr

385

385

385

385

0

0

300

300

300

300

500

500

500

500

vbr

vbr

vbr

vbr

32 7168

32 7168

32 7168

32 1023

The fields in this display are defined as follows:

15

0 15

0 15

4E3 0 15

14 4

14 4

14 4

14 4

Field	Description
Port	The port number of the SPANS signalling path.
VPI	The virtual path number of the SPANS signalling path.
SigVCI	The virtual channel number used for SPANS messages on the SPANS path.
CLSVCI	The VCI used for connectionless messages.
AAL	The AAL type used for SPANS messages.
MinVCI	The bottom number for the range of VCIs to be reserved for SPANS SVCs on this path.
MaxVCI	The top number for the range of VCIs to be reserved for SPANS SVCs on this path.
SigBW	The amount of bandwidth reserved on the VCI for SPANS signalling messages.
CLSUPC	The integer index that refers to a specific UPC contract used to police the connectionless VCI.
OpenT/O	The timeout, in msec, for SPANS open requests.
CloseT/O	The timeout, in msec, for SPANS close requests.
OutServ	Shows that the output SPANS VCC resides in the VBR service queue. This is a read-only field.

To list SPANS information for a specific port, (for example, port 4D1), enter the following parameters:

```
myswitch::configuration spans> show 4d1

Port VPI State Type CDVT Action RemoteAddress
4D1 0 up uni 250 drop 172.19.8.134
```

The fields in this display are defined in the same manner as those in the previous example.

To list SPANS information for a specific port and path, (for example, port 4D1 and VPI 0), enter the following parameters:

```
myswitch::configuration spans> show 4d1 0

Port VPI State Type CDVT Action RemoteAddress
4D1 0 up uni 250 drop 172.19.8.134
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced SPANS information for a specific port and path, (for example, port 4D1 and VPI 0), enter the following parameters:

```
myswitch::configuration spans> show 4d1 0 advanced

Port VPI SigVCI CLSVCI AAL MinVCI MaxVCI SigBW CLSUPC OpenT/O CloseT/O OutServ
4D1 0 15 14 4 32 511 385 0 300 500 vbr
```

The fields in this display are defined in the same manner as those in the previous example.

SPANS Configuration Commands

CHAPTER 12 SPVX Configuration Commands

These commands allow you to configure SPVCCs and SPVPCs. To display the list of available subcommands, type spvx? at the configuration level.

```
myswitch::configuration spvx> ?
spvcc> spvpc>
```

12.1 SPVCC Configuration Commands

These commands allow you to configure Smart Permanent Virtual Circuit Connections (SPVCCs, hereafter referred to as SPVCs). An SPVC is a connection that goes across multiple switch fabrics. An SPVC looks like a PVC at the local and remote endpoints with an SVC in the middle. SPVCs are more robust than PVCs. If a link carrying a PVC goes down, then the PVC goes down. If a link carrying an SPVC goes down and there is an alternate route, then the end switch fabrics of the SPVC automatically reroute the SPVC around the failed link. To display the list of available subcommands, type ? at the spvcc level.

```
myswitch::configuration spvx spvcc> ?
spans> pnni>
```

12.1.1 SPANS SPVCC Configuration Commands

These commands allow you to configure SPANS SPVCs. To create a SPANS SPVC, you must configure the two ends concurrently on the two switch fabrics. Therefore, you must have an AMI session open on both the local switch fabric and the destination switch fabric. To display the list of available subcommands, type? at the spans level.

12.1.1.1 Deleting a SPANS SPVC

This command allows you to delete an existing SPANS SPVC. There are two different ways to delete an SPVC. Enter the following parameters:

12.1.1.2 Creating a SPANS SPVC

This command allows you to create a new SPANS SPVC. Enter the following parameters:

```
myswitch::configuration spvx spvcc spans> new <port> <vpi> <vci> <dest-session> <dest-port> <dest-vpi> <dest-vci> \
[-peak <Kb/sec>] [(source | destination | bidirectional)]

Note: <dest-session> is the name of the open session to the peer switch.
The peer session must be opened with the SNMP read-write community.
```

The parameters for delete and new are defined as follows:

Parameter	Description
Local SPVC ID	Used only with the delete command. The unique number that the SCP assigned to this SPANS SPVC when it was created.
port	The port number on the local switch fabric.
vpi	The virtual path number on the local switch fabric.
vci	The virtual channel number on the local switch fabric.
dest-session	The IP address of the remote switch.
dest-port	The port number on the remote switch fabric.
dest-vpi	The virtual path number on the remote switch fabric.
dest-vci	The virtual channel number on the remote switch fabric.

Parameter	Description
-peak <kb sec=""></kb>	The amount of peak bandwidth allocated for this SPANS SPVC, specified in kilobits per second. The default is 0.
source destination bidirectional	source means a unidirectional SPANS SPVC going from the local switch fabric to the remote switch fabric will be created. destination means a unidirectional SPANS SPVC going from the remote switch fabric to the local switch fabric will be created. bidirectional means the pair of unidirectional SPANS SPVCs will be created. The default direction, if you do not specify one, is bidirectional.



To create a bidirectional SPANS SPVC, you must either specify bidirectional, or you must set up two unidirectional SPANS SPVCs with one going in each direction.

To create a SPANS SPVC, you need to configure the two ends concurrently on the two switch fabrics. Therefore, you first need to open an AMI session to the destination switch fabric by using the SCP's IP address, along with the SNMP read-write community string. The following example depicts how to create a bidirectional SPVC from the local switch fabric (myswitch) to a remote switch fabric (198.29.22.46 named fishtank). The asterisk (*) in front of the prompt indicates that it is a remote session. To return to the local session, you must type <code>localhost</code> (instead of the prompt name).

```
myswitch::> open 198.29.22.46 private

Opening a session for "198.29.22.46", please wait...
Connected to "198.29.22.46" (asx200bx).
*fishtank::> localhost

myswitch::configuration spvx spvcc spans new <port> <vpi> <vci> <dest-session> <dest-port> <dest-vpi> <dest-vci> \
[-peak <Kb/sec>] [(source | destination | bidirectional)]

myswitch::configuration spvx spvcc spans new lc1 0 49 198.29.22.46 1b1 0 50
```

12.1.1.3 Displaying SPANS SPVC Information

This command allows you to display all of the SPANS SPVCs on an individual switch fabric. Enter the following parameters:

```
      myswitch::configuration spvx spvcc spans> show

      Local
      Remote

      ID
      Port VPI VCI
      BW Direction
      ID
      Port VPI VCI Switch

      35664
      1C1
      0
      51
      0.0 bidirectional
      10427
      1B1
      0
      52
      198.29.22.46

      65364
      1C1
      0
      49
      0.0 bidirectional
      42591
      1B1
      0
      50
      198.29.22.46
```

The fields in this display are defined as follows:

Field	Description
Local ID	The unique number that the local switch fabric's SCP assigned to this SPANS SPVC when it was created.
Local Port	The port number on the local switch fabric.
Local VPI	The virtual path number on the local switch fabric.
Local VCI	The virtual channel number on the local switch fabric.
Local BW	The amount of peak bandwidth allocated for this SPANS SPVC, specified in Kbps.
Direction	source means this is a unidirectional SPANS SPVC going from the local switch fabric to the remote switch fabric. destination means this is a unidirectional SPANS SPVC going from the remote switch fabric to the local switch fabric. bidirectional this is a pair of unidirectional SPANS SPVCs, with one going in each direction.
Remote ID	The unique number that the remote switch fabric's SCP assigned to this SPANS SPVC when it was created.
Remote Port	The port number on the remote switch fabric.
Remote VPI	The virtual path number on the remote switch fabric.
Remote VCI	The virtual channel number on the remote switch fabric.
Switch	The IP address or name of the remote switch fabric's SCP.

The following is displayed if no SPANS SPVCS have been configured:

```
myswitch::configuration spvx spvcc spans> show
No SPVC information is available
```

12.1.2 PNNI SPVCC Configuration Commands

These commands allow you to configure ATM Forum PNNI and *ForeThought* PNNI point-to-point (PP) or point-to-multipoint (PMP) SPVCs. Unlike the SPANS SPVCs, PNNI SPVCs are inherently bidirectional, which means that a single signalling call establishes the circuits in both directions. Although PNNI SPVCs are bidirectional, the endpoint that initiates the call setup is the source (originating) and the other endpoint is the destination (terminating or party). You can display the list of available subcommands by typing? at the pnni level.

12.1.2.1 Obtaining a Destination NSAP for a PNNI SPVC

This command is used at the destination switch to obtain the NSAP address to be used as the <destnsap> parameter under the conf spvx spvcc pnni pp new command or <nsap> parameter under the conf spvx spvcc pnni pmp new command at the source switch. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni> destnsap <domainid> <port>
```

These parameters are defined as follows:

Parameter	Description
<domainid></domainid>	The PNNI domain ID number on the destination switch fabric. The prefix corresponding to that routing domain is used to compute the destination NSAP address. For a list of valid domain identifiers use the conf atmr domain show command.
<port></port>	The port on which the permanent portion of the SPVC needs to terminate on the destination switch.

For example:

```
myswitch::configuration spvx spvcc pnni> destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f2la2ec0.0020480d0211.00
```

12.1.2.2 Configuring PNNI Point-to-Point SPVCs

These commands allow you to configure PNNI point-to-point SPVCs. You can display the list of available subcommands by typing? at the pp level.

```
myswitch::configuration spvx spvcc pnni pp> ?
batch delete new modify
show
```

12.1.2.2.1 Batch Command for PNNI Point-to-Point SPVCs

This command lets you create or delete a large number of point-to-point PVCs and/or SPVCs by executing an AMI command script that resides on the FLASH. This same command also exists under conf vcc, conf spvx spvcc pnni pmp, and conf spvx spvpc. To use this command, do the following:

Create an ASCII text script file on a host. This file should list all of the new commands or delete commands in the order in which you wish to create or delete the connections.



When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter configuration instead of just conf.



To simplify batch creation, you can create a few connections first, store the file as an externalized CDB script, and then edit the file.

- 2. Compress the script file with the gzip utility.
- 3. Load the script file on to the switch using the command oper flash get <host:remotefile><localfile>.
- 4. Use the command conf spvx spvcc pnni pp batch <file.gz> [-delay <seconds>] to execute the script on the switch. This command sequentially executes every PVC and SPVC command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second PVC with a particular VCI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- configuration upc new <index> ubr [aal5 [noPktDisc]] [ubrTagging]
 [-name <name>]
- configuration upc delete <index>
- configuration vpt new <port> <vpi>[(term | orig)] [-minvci <vci>]
 [-maxvci <vci>]
- configuration vpt delete <port> <vpi>[(term | orig)]
- configuration vcc new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci> [-upc <index>]
 [-name <name>]
- configuration vcc delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
- configuration spvx spvcc pnni pp new <port> <vpi> <vci> <destnsap>

```
[-priority <priority>]
-spvcid <index>
[-domainid <id>] \
[-name <name>] [-destvpi <vpi>-destvci <vci>]
[-fupc <index>] [-bupc <index>]
[-reroute (enable|disable)]
[-autoDtl (enable|disable)]
[-backoff (enable | disable)]
[-dtlTag <tag>]
[-bearerClass (X | A | C)] [-clip <no|yes>] \
[-QoSExpIndex <index>]\
[-fqos (class0 | class1 | class2 | class3 | class4)] \
[-bqos (class0 | class1 | class2 | class3 | class4)]
```

configuration spvx spvcc pnni pp delete <SPVC ID | SPVC ID range (x-y)>

To use this command, enter the following parameters:

```
myswitch::configuration spvx spvcc pnni pp> batch <file.gz> [-delay <seconds>]
```

These parameters are defined as follows:

Parameter	Description
file.gz	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

12.1.2.2.2 Creating a PNNI Point-to-Point SPVC

This command lets you create a PNNI point-to-point SPVC. Enter the following parameters:



You do not need to open a session to the destination switch to create a PNNI SPVC because all PNNI SPVCs are bidirectional.

The parameters for **new** and **modify** are defined as follows:

Parameter	Description
SPVC ID or <spvcid> or -spvcid <index></index></spvcid>	The index number assigned to this point-to-point SPVC to identify it uniquely. For PNNI SPVCs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
port	The port number where the permanent portion of the SPVC resides on the source (local) switch fabric.
vpi	The virtual path number for the permanent portion of the SPVC on the source (local) switch fabric.
vci	The virtual channel number for the permanent portion of the SPVC on the source (local) switch fabric.
destnsap	The ATM NSAP address of the destination (remote) switch for this SPVC. Use the conf spvx spvcc pnni destnsap command on the destination switch to obtain this address. See Section 12.1.2.1 for more information.

Parameter	Description
-priority <pri>-priority></pri>	The order in which and the frequency with which you want this point-to-point SPVC to be tried for a connection. Valid values are from 1 to lowestpriority, with 1 being the highest priority (the first and the most often tried) and with lowestpriority being the value configured under conf spvx spvcc pnni parameters priority lowestpriority. The default value is half of the value of lowestpriority, rounded off to the lowest integer. The value for lowestpriority is defaulted to 10. Higher priority SPVCs are tried more often than lower priority SPVCs. The value of lowestpriority determines the number of times each SPVC is tried before attempting a lower priority SPVC. Point-to-point and point-to-multipoint SPVC priorities are shared. Some point-to-point or PMP SPVCs can be assigned a higher priority compared to other point-to-point or PMP SPVCs. For point-to-point and PMP SPVCs with equal priority, point-to-point SPVCs have higher priority over PMP SPVCs.
-domainid <id></id>	The PNNI domain ID number on the source (local) switch fabric. The default is 1, which is the ID of the default routing domain.
-name <name></name>	An optional name for the user to assign to this PNNI SPVC to help uniquely identify it.
-destvpi <vpi></vpi>	The virtual path number on the destination switch fabric for this PNNI SPVC. When using this option, both the <code>-destvpi</code> and <code>-destvci</code> must be specified. If this option is not used, the destination switch uses any available value.
-destvci <vci></vci>	The virtual channel number on the destination switch fabric for this PNNI SPVC. When using this option, both the <code>-destvpi</code> and <code>-destvci</code> must be specified. If this option is not used, the destination switch uses any available value.
-fupc <index>1</index>	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the conf upc show command. If no index is specified, the default index of 0 (UBR best effort) is used.
-bupc <index></index>	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the conf upc show command. If no index is specified, the default index of 0 (UBR best effort) is used.
-reroute (enable disable)	enable indicates that this SPVC will be examined periodically to see if it is using a sub- optimal route. If it is, it will be rerouted using a better route if available in conf spvx spvcc pnni parameters reroute. (See Section 12.1.2.4.5 for more information about this command.) disable indicates that this SPVC will not be retried, even if a DTL with a higher priority becomes available. The default state for PNNI SPVCs is enable.
-autoDtl (enable disable)	enable means that dynamic path computation is used to route an SPVC when all of the configured DTLs fail. disable means that dynamic path computation is not used to route an SPVC when all of the configured DTLs fail. This feature applies to both FT-PNNI and PNNI DTLs. The default is enable. This flag does not apply when no DTLs are configured.
-backoff (enable disable)	enable means the back-off mechanism is used for this point-to-point SPVC. Upon a failure, the failed directed DTL is not retried until the amount of time specified under conf spvx spvcc pnni parameters backoff interval has elapsed. This allows old information to age out and the network to stabilize. disable means the back-off mechanism is not used for this SPVC and directed DTLs that are configured for this SPVC are retried continually even after a failure. The default is enable. See Section 12.1.2.4 for more information.

Parameter	Description
-dtlTag <tag></tag>	The Designated Transit List (DTL) tag, or index number, assigned to this SPVC which corresponds to a list of preferred DTLs that you configure under conf atmr dtltable. The DTL specifies the preferred call routing for the SVC portion of the SPVC. See Section 12.1.2.4 in this manual for more information.
-bearerClass (X A C)	The requested broadband bearer class for this point-to-point SPVC. x is for all types of ATM media. A is for non-ATM CBR media. C is for non-ATM VBR, UBR, and ABR media. The default is x .
-clip <no yes="" =""></no>	During speech transmission, clipping is the loss of a brief interval at the beginning of a speech spurt. no indicates this SPVC is not susceptible to clipping. yes indicates this SPVC is susceptible to clipping. The default is no.
-QoSExpIndex <index></index>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVC call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show for this number. The qosindex that is specified for this SPVC must already be present in the switch. The default is 0.
-fqos (class0 class1 class2 class3 class4)	The requested QoS class for this point-to-point SPVC in the forward (calling to called) direction. The -fqos and -bqos options must be either both class0 or both a non-zero class. The default is class0.
-bqos (class0 class1 class2 class3 class4)	The requested QoS class for this point-to-point SPVC in the backward (called to calling) direction. The -fqos and -bqos options must be either both class0 or both a non-zero class. The default is class0.

The forward and backward UPC contracts that you specify must be compatible with the bearerClass parameter for the SPVC (e.g., all parameters are for VBR traffic or CBR traffic).



When creating a point-to-point SPVC, the <code>-fqos</code> and <code>-bqos</code> options must be either both <code>class0</code> or both a non-zero class. For example, the <code>-fqos</code> cannot be <code>class0</code> and the <code>-bqos</code> be <code>class1</code>. This combination is invalid. Having an <code>-fqos</code> of <code>class0</code> and a <code>-bqos</code> of <code>class0</code> is a valid combination, and having an <code>-fqos</code> of <code>class1</code> and a <code>-bqos</code> of <code>class4</code> is a valid combination, but having an <code>-fqos</code> of <code>class2</code> and a <code>-bqos</code> of <code>class0</code> is not valid.



If the destination switch is running a pre-ForeThought 5.3.x release, you have to compute the destination NSAP address using the <destprefix:destport> option. Since ForeThought 5.3.x. the <destprefix:destport> was option replaced. If the destination switch is running ForeThought 5.3.x or greater, you should use the specifying <destnsap> option of destination. You can use the conf spyx spycc pnni destination command on the destination switch to obtain the NSAP address to be used with the conf spvx spvcc pnni pp new command at the source switch.

The following is an example of how to create a simple PNNI point-to-point SPVC using the <code><destnsap></code> parameter. This method can only be used if the destination switch is running <code>ForeThought 5.3.x</code> or <code>greater</code>.

1. Open a session to the destination switch as follows:

```
myswitch::> open 198.29.22.46 private
Opening a session for "198.29.22.46", please wait...
Connected to "198.29.22.46" (asx200bx).
*fishtank::>
```

2. Run the following command on the destination switch to obtain that switch's NSAP address:

```
*fishtank::>conf spvx spvcc pnni destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

3. Go back to the source switch and create a new PNNI point-to-point SPVC. Copy the NSAP address into the command for the *<destnsap>* parameter:

```
*fishtank::> localhost

myswitch::>conf spvx spvcc pnni pp new lal 0 100

0x47.000580ffel000000f2la2ec0.0020480d0211.00
```

The following is an example of how to create a PNNI point-to-point SPVC with DTLs using the <code><destnsap></code> option. This method can only be used if the destination switch is running <code>ForeThought 5.3.x</code> or <code>greater</code>.

- 1. Perform steps 1 and 2 from the previous example.
- 2. Go back to the source switch and create a new PNNI point-to-point SPVC. Copy the NSAP address into the command for the <destnsap> parameter. Indicate the DTL tag under confatmrdtltable that contains the DTLs and weights that you want to use for the DTLs.

```
*fishtank::> localhost
myswitch::>conf spvx spvcc pnni pp new lal 0 100
0x47.000580ffe1000000f2la2ec0.0020480d0211.00 -reroute enable -dtlTag 5
```

The following is an example of how to compute the destination NSAP when creating a PNNI point-to-point SPVC. This method should only be used if the destination switch is running a <u>pre-ForeThought 5.3.x release</u>.

- 1. The first 13 bytes of the destination NSAP address are the same as the prefix of the routing domain on the destination switch. Use conf atmr domain show on the destination switch to obtain this prefix.
- 2. The next four bytes of the destination NSAP address is a constant value: 0020480d (given in hexadecimal format).
- 3. The next two bytes of the destination NSAP address depend on the destination port. Each port in a switch has a port identifier that uniquely defines the port. This identifier should be encoded in the next two bytes. Please see Appendix A of the *ATM Switch Diagnostic and Troubleshooting Manual* for the port numbering schemes of the various switches.
- 4. For example, the port identifier for port 2b2 on an *ASX*-1000, *ASX*-1200, or *TNX*-1100 (as shown in Table A.3) is 66, which represented using 2 bytes in hexadecimal is 0042.
- 5. The last byte of the destination NSAP address is not significant for routing purposes and can be encoded to zeroes (00).

For example, suppose the destination switch is an *ASX*-1000 switch running *ForeThought* 5.0.x. Its routing domain's prefix is 0x47.0005.80.ffe100.0000.f21a.37fe and the destination port is 3d2. The port identifier for port 3d2 is 139, which is 8b in hexadecimal. The destination NSAP address is computed as follows:

```
<0x47.0005.80.ffe100.0000.f21a.37fe> + <0020480d> + <008b> + <00>
which is:
```

0x47.000580ffe1000000f21a37fe.0020480d008b.00

12.1.2.2.3 Using DTLs with PNNI Point-to-Point SPVCs

ForeThought PNNI Designated Transit Lists (DTLs) for point-to-point SPVCs are created using the conf atmr ftpnni dtl new command as described in the ATMR chapter of Part 1 of this manual. ATM Forum PNNI DTLs are created using the conf atmr pnni dtl new command as described in Section 4.4.7.5 in Part 1 of this manual. A DTL is a source route (uniquely identified by a pair of indices: nodeindex and dtlindex) which specifies the preferred call routing for the SVC portion of a directed SPVC. Each entry (row) in the DTL represents a single hop in the source route.

Once you have created the DTLs, you can create a table (list of DTLs) using the conf atmrdtltable new command. (See Chapter 4 in Part 1 of this manual for more information about this command.) In this table, each DTL is assigned a weight which indicates the priority in which the DTLs are tried, with the highest weight being the first one tried. The weights are arbitrary (e.g., 10, 20, 30, and 40). You can even assign two or more DTLs with the same weight. The table is also assigned an arbitrary tag number which uniquely identifies the table. This tag can be applied on a per-SPVC basis using the -dtltag advanced options under conf spvx spvcc pnni pp new (or modify). Multiple SPVCs can use the same DTL table.

When an SPVC is created with a DTL tag assigned to it, the DTL in the corresponding table with the highest weight is tried first. If this DTL is unusable, the DTL with the next highest weight is tried. This process is repeated until a DTL in that table is found that provides a route to the destination which satisfies the QoS requirements.

If none of the user-specified DTLs in the table can be used, and if the -autoDtl option under conf spvx spvcc pnni pp new (or modify) is set to enable, the call is dynamically routed if an alternative path can be computed. If that option is set to disable, then the call setup fails, but the DTLs are retried periodically.

If any of the DTLs fail, an entry is made in the syslog which indicates that the attempt failed, which DTL was tried, and the time at which the failure occurred. When a DTL fails, a back-off mechanism is used to determine when to retry that particular DTL. The DTL is not attempted for a user-configured interval in order to allow any old information to age out and allow the network to stabilize. This interval is set under conf spvx spvcc pnni parameters backoff interval seconds>. However, you can enable or disable this back-off mechanism on a per-SPVC basis using the -backoff option under conf spvx spvcc pnni pp new (or modify). The default setting is enable. If you disable this mechanism, then instead of waiting for the user-configured back-off interval after a failure, the DTLs are retried at every reroute interval. If the -backoff option is changed using the modify command on an existing SPVC, the remaining waiting period for any failed DTLs is cleared and the DTLs are attempted again.

Once an SPVC is established, if the -reroute option under conf spvx spvcc pnni pp new (or modify) is set to enable, the SPVC is checked periodically to see that the most preferred route is being used. If it is not being used, an attempt is made to re-establish the circuit using a DTL with a higher weight. If this succeeds, but not with the designated most preferred route, this process is continued until the SPVC is using the designated most preferred route. DTLs with equal weights are ignored on a retry once an SPVC is established with a given weight.

12.1.2.2.4 Modifying a PNNI Point-to-Point SPVC

This command lets you modify existing PNNI point-to-point SPVC configuration parameters. Enter the following:

```
myswitch::configuration spvx spvcc pnni pp> modify <spvcid> \
  [-priority <priority>]\
  [-reroute (enable|disable) \
  [-autoDtl (enable|disable) \
  [-backoff (enable|disable) \
  [-dtlTag <tag>]
```



When a PNNI or FT-PNNI DTL is part of any DTL tag table, it cannot be deleted.

These parameters are defined in Section 12.1.2.2.2.

12.1.2.2.5 Deleting a PNNI Point-to-Point SPVC

This command allows you to delete an existing PNNI point-to-point SPVC from the source switch. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni pp> delete <SPVC ID | SPVC ID range (x-y)>
```

The following is an example of how to delete a specific PNNI point-to-point SPVC:

```
myswitch::configuration spvx spvcc pnni pp> delete 3428
```

If a range is specified, all of the point-to-point SPVCs that have an SPVC ID within that range are deleted. The total number of SPVCs that are deleted is displayed as follows:

```
myswitch::configuration spvx spvcc pnni pp> delete 3-10
Total number of SPVCCs deleted : 3
```

If you enter an SPVC ID that does not exist, the following error message is returned:

```
myswitch::configuration spvx spvcc pnni pp> delete 16451
?ERROR: SPVCC does not exist
```

These parameters are defined as follows:

Parameter	Description
SPVC ID	The index number assigned to the point-to-point SPVC you want to delete. The SPVC ID is found in the INDEX field under conf spvx spvcc pnni pp show.
SPVC ID range (x-y)	Enter the range of index numbers of the point-to-point SPVCs that you want to delete, separated by a hyphen; e.g., 150-300.

12.1.2.2.6 Displaying PNNI Point-to-Point SPVC Information

This command allows you to display all of the PNNI point-to-point SPVCs that originate and terminate on an individual switch fabric. By entering <code>show</code>?, you can list the various ways of displaying PNNI point-to-point SPVC information as follows:

```
myswitch::configuration spvx spvcc pnni pp> show ?
usage: show [<spvcid>] [(orig | term)] [(advanced | summary)]
```

These parameters are defined as follows:

Parameter	Description
show	By entering show with no arguments, basic information is displayed for all originating and terminating PNNI point-to-point SPVCs associated with this switch.
spvcid	By entering show with a specific <i><spvcid></spvcid></i> , lists basic information for only that PNNI point-to-point SPVC.
orig	By entering show orig, basic information is displayed for all originating PNNI point-to-point SPVCs associated with this switch.
term	By entering show term, basic information is displayed for all terminating PNNI point-to-point SPVCs associated with this switch.
advanced	By entering show advanced, both basic and advanced information is displayed for the PNNI point-to-point SPVCs specified in the option.
summary	By entering show summary, only the first line of basic information is displayed for each PNNI point-to-point SPVC. This option is useful for quickly finding out information such as which PNNI point-to-point SPVCs are up and which are down, or the priority of the PNNI point-to-point SPVCs.

12.1.2.2.6.1 Displaying Basic PNNI Point-to-Point SPVC Information

To display basic information about all PNNI point-to-point SPVCs on this switch, enter the following:

The fields in this display are defined as follows:

Field	Description
Source INDEX	The index number assigned to this PNNI point-to-point SPVC by AMI to identify it uniquely from other PNNI point-to-point SPVCs that have this switch fabric as their source.
Source PORT	The port identifier on the originating switch fabric that contains the permanent portion for this PNNI point-to-point SPVC.
Source VPI	The virtual path number used in the permanent portion of this PNNI point-to-point SPVC on the originating switch fabric.
Source VCI	The virtual channel number in the permanent portion of this PNNI point-to-point SPVC on the originating switch fabric.
Source UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this PNNI point-to-point SPVC.
Source	The NSAP ATM address for the originating side of the PNNI point-to-point SPVC.
Destination PORT	The port identifier on the terminating switch fabric that contains the permanent portion for this PNNI point-to-point SPVC, if the destination end is a FORE switch. If the port at the destination switch cannot be determined, a question mark (?) is displayed.
Destination VPI	The virtual path number used in the permanent portion of this PNNI point-to-point SPVC on the destination switch fabric. any means the user did not specify the VPI to be used at the destination.
Destination VCI	The virtual channel number used in the permanent portion of this PNNI point-to-point SPVC on the destination switch fabric. any means the user did not specify the VCI to be used at the destination.

Field	Description
Destination UPC	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index associated with this PNNI point-to-point SPVC.
Destination VPVC-SEL	NoPref means that you did not specify which VPI/VCI combination that the destination switch should use for the permanent portion when this PNNI point-to-point SPVC was created. If the destination switch is a FORE switch, the values are displayed in the Destination VPI and Destination VCI fields. If the destination switch is not a FORE switch, a ? is displayed in the Destination VPI and Destination VCI fields. Require means that the destination switch must use the VPI/VCI combination given for the permanent portion when the PNNI point-to-point SPVC was created.
PRIORITY	The order in which this SPVC is tried for a connection. Values are from 1 to lowestpriority, with 1 being the highest priority (the first tried and the most often tried) and with lowestpriority being the value configured under conf spvx spvcc pnni parameters priority lowestpriority.
	Point-to-point and point-to-multipoint SPVC priorities are shared meaning some point-to-point or PMP SPVCs can be assigned a higher priority compared to other point-to-point or PMP SPVCs. For point-to-point and PMP SPVCs with equal priority, point-to-point SPVCs have higher priority over PMP SPVCs.
STATE	The operational state of this point-to-point SPVC. Can be up or down.
Destination	The NSAP ATM address for the terminating side of the PNNI point-to-point SPVC.

12.1.2.2.6.2 Displaying Advanced PNNI Point-to-Point SPVC Information

To display advanced information about PNNI point-to-point SPVCs on this switch, enter the following:

```
myswitch::configuration spvx spvcc pnni pp> show advanced
 Originating PNNI SPVCCs:
        Source
                          Destination
  INDEX PORT VPI VCI UPC PORT VPI VCI UPC VPVC-SEL PRIORITY STATE
                 402 0 18 0 402 0
                                            require 1
        Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
 DTL info:
  DTL tag = 10
  Backoff: enabled, AutoDtl: enabled
  DTL in use: proto = pnni, nodeIndex = 1, dtlIndex = 100
 Advanced info:
  Name = N/A, Cost = N/A, Reroute = enabled
  BearerClass = classX, ForwardQos = class0, BackwardQos = class0, Clip = no
  Domainid = 1, QoSExpIndex = 0
  Uptime = 0 days 01:19
 Terminating PNNI SPVCCs:
        Source
                      Destination
  INDEX PORT VPI VCI PORT VPI VCI STATE
        2 0
                 401 1B4 0 401 up
        Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
  BearerClass = classX, ForwardQos = class0, BackwardQos = class0, Clip = no
  Uptime = 0 days 05:46
 Originating PNNI SPVCCs:
                          Destination
  INDEX PORT VPI VCI UPC PORT VPI VCI UPC VPVC-SEL PRIORITY STATE
                 400 0
                         16
                              0
                                    400 0
                                            require 1
        Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d00a5.00
 DTL info:
  DTL tag = 8
  Backoff: enabled, AutoDtl: enabled
 Advanced info:
  Name = N/A, Cost = N/A, Reroute = enabled
  BearerClass = classX, ForwardQos = class0, BackwardQos = class0, Clip = no
  Domainid = 1, QoSExpIndex = 0
  Last Failure Cause = resource-unavailable-or-unspecified-Cause47
Last Failure Location = LCL:1 LINK:65533 VPI:65533 NSAP:47000580ffe1000000f21a3552
  Downtime = 0 days 05:46, Retry Count = 1851
```

The DTL and advanced information fields in this display are defined as follows:

Field	Description
DtlTag	The Designated Transit List (DTL) tag, or index number, assigned to this point-to-point SPVC which corresponds to a DTL table that you configure under conf atmr dtltable. The DTL specifies the preferred call routing SVC portion of the point-to-point SPVC.
Backoff	enabled means the back-off mechanism is used for this point-to-point SPVC. Upon a failure, directed DTLs that are configured for this point-to-point SPVC are not retried until the amount of time specified under conf spvx spvcc pnni parameters backoff interval has elapsed. This allows old information to age out and allow the network to stabilize. disabled means the back-off mechanism is not used for this point-to-point SPVC and directed DTLs that are configured for this point-to-point SPVC are retried continually upon a failure.
AutoDtl	enabled means that dynamic path computation is used to route a point-to-point SPVC when all of the configured DTLs fail or when no DTLs are configured. disabled means that dynamic path computation is not used to route a point-to-point SPVC when all of the configured DTLs fail or when no DTLs are configured. This feature applies to both FT-PNNI and PNNI DTLs.
proto	Shows which protocol this DTL is using. Can be either pnni or ftpnni.
nodeIndex	The index number of the PNNI node on which the DTLs are being used. This field is not displayed when the protocol is FT-PNNI.
dtlIndex	The index number of the DTL.
Name	The optional name assigned to this PNNI point-to-point SPVC to help identify it. If no name is assigned, ${\tt N/A}$ is displayed.
Cost	The current call routing cost for this originating PNNI point-to-point SPVC. If the SPVC is down, shows ${\tt N/A}$.
Reroute	enabled means this SPVC is examined to see if it is using a sub-optimal route. If it is, it is rerouted according to the parameters in conf spvx spvcc pnni parameters reroute. disabled means this point-to-point SPVC is not examined to see if it is using a sub-optimal route.
BearerClass	The broadband bearer class specified for this PNNI point-to-point SPVC. Can be classA, classC, or classX.
ForwardQos	The requested quality of service for this point-to-point SPVC in the forward (calling to called) direction.
BackwardQos	The requested quality of service for this point-to-point SPVC in the backward (called to calling) direction.
Clip	no means this PNNI point-to-point SPVC is not susceptible to clipping and yes means it is susceptible to clipping.
Domainid	The PNNI domain ID number on the source (local) switch fabric.
QoSExpIndex	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the point-to-point SPVC call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show for this number.

Field	Description
Last Failure Cause	The reason for the last call setup failure for this PNNI point-to-point SPVC. This field is only displayed for originating SPVCs that are down.
Last Failure Location	Upon a call setup failure for this PNNI point-to-point SPVC, indicates the exact link, VPI, and NSAP address where the failure occurred.
Uptime	If applicable, shows, in hundredths of a second, the time since this PNNI point-to-point SPVC was created or the time since the last successful call setup occurred. The STATE shows up.
Downtime	If applicable, shows, in hundredths of a second, the time that this PNNI point-to-point SPVC has been down. The STATE shows down.
Retry Count	Displays the number of times the call setup has been attempted since the PNNI point-to-point SPVC was created or since the last successful call setup occurred. This is only displayed when the STATE is down.

12.1.2.2.6.3 Displaying Summary PNNI Point-to-Point SPVC Information

When the **summary** option is specified, only the first line of basic information is displayed for each point-to-point SPVC. This option is useful for quickly finding out information such as which point-to-point SPVCs are up and which are down, or the priority of the SPVCs. To display summary information about PNNI point-to-point SPVCs on a switch, enter the following:

myswitch::configuration spvx spvcc pnni pp> show summary
Originating PNNI SPVCCs:

Source				Destination								
	INDEX	PORT	VPI	VCI	UPC	PORT	VPI	VCI	UPC	VPVC-SEL	PRIORITY	STATE
	2172	4B1	0	103	0	0	any	any	0	noPref	10	up
	20184	4B1	0	102	0	0	0	32	0	noPref	10	up
	23880	4B1	0	104	0	0	any	any	0	noPref	10	up
	24108	4B1	0	101	0	0	0	33	0	noPref	10	up

Terminating PNNI SPVCCs:

Source				Destination				
	INDEX	PORT	VPI	VCI	PORT	VPI	VCI	STATE
	1	0	0	100	4B2	0	32	up
	2	0	0	101	4B2	0	33	up

You can also display summary information for just the originating or just the terminating point-to-point SPVCs as follows:

myswitch::configuration spvx spvcc pnni pp> show orig summary
Originating PNNI SPVCCs:

Source				Destination								
	INDEX	PORT	VPI	VCI	UPC	PORT	VPI	VCI	UPC	VPVC-SEL	PRIORITY	STATE
	2172	4B1	0	103	0	0	any	any	0	noPref	10	up
	20184	4B1	0	102	0	0	0	32	0	noPref	10	up
	23880	4B1	0	104	0	0	any	any	0	noPref	10	up
	24108	4B1	0	101	0	0	0	33	0	noPref	10	up

myswitch::configuration spvx spvcc pnni pp> show term summary
Terminating PNNI SPVCCs:

Source					Destination					
	INDEX	PORT	VPI	VCI	PORT	VPI	VCI	STATE		
	1	0	0	100	4B2	0	32	up		
	2	0	0	101	4B2	0	33	up		

You can also display summary information for an individual point-to-point SPVC as follows:

The fields in all of these displays are defined as listed previously for conf spvx spvc pnni pp show.

If no PNNI point-to-point SPVCs have been configured, you receive the following message:

```
myswitch::configuration spvx spvcc pnni pp> show
Originating PNNI SPVCCs:
No originating PNNI SPVCC information is available
Terminating PNNI SPVCCs:
No terminating PNNI SPVCC information is available
```

12.1.2.3 Configuring PNNI Point-to-Multipoint SPVCs

These commands allow you to configure PNNI and FT-PNNI PMP SPVCs. You can display the list of available subcommands by typing? at the pmp level.

myswitch::configuration spvx spvcc pnni pmp> ?
 batch new modify delete
 addparty deleteparty reroute show



Call recording should be enabled before any calls are setup for PMP.



Point-to-multipoint calls are always recorded as a series of legs. If you have a PMP PVC from A to B and from A to C, and a filter is applied to only record PVCs that involve port A, then both legs will be recorded. If the PMP PVC is from A to B and from B to C, then the same filter would not allow the B to C leg to be recorded.

12.1.2.3.1 Batch Command for PNNI Point-to-Multipoint SPVCs

This command lets you create or delete a large number of PMP SPVCs by executing an AMI command script that resides on the FLASH. This same command also exists under conf vcc, conf spvx spvcc pnni pp, and conf spvx spvpc. To use this command, do the following:

1. Create an ASCII text script file on a host. This file should list all of the new commands, delete commands, addparty command, and deleteparty command in the order in which you wish to create or delete the connections.



The new commands must specify only the "root" specific options. All parties must be created using the addparty command and only the party specific options can be specified. All parties belonging to a PMP SPVC must be deleted using the deleteparty command before deleting the root itself within the delete command.



When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter configuration instead of just conf.



To simplify batch creation, you can create a few connections first, store the file as an externalized CDB script, and then edit the file.

- 2. Compress the script file with the gzip utility.
- 3. Load the script file on to the switch using the command oper flash get <host:remotefile><localfile>.
- 4. Use the command conf spvx spvcc pnni pmp batch <file.gz> [-delay <seconds>] to execute the script on the switch. This command sequentially executes every point-to-multipoint PVC and SPVC command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second PVC with a particular VCI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- configuration upc new <index> ubr [aal5 [noPktDisc]] [ubrTagging]
 [-name <name>]
- configuration upc delete <index>
- configuration vpt new <port> <vpi>[(term | orig)] [-minvci <vci>]
 [-maxvci <vci>]
- configuration vpt delete <port> <vpi>[(term | orig)]
- configuration vcc new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci> [-upc <index>]
 [-name <name>]
- configuration vcc delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
- configuration spvx spvcc pnni pmp new <port> <vpi> <vci>

```
[-priority <priority>]
[-pmpspvccid <index>]
[-fupc <index>]
[-name <name>]
[-domainid <id>]
[-bearerClass (X | A | C)] [-clip <no|yes>] \
[-fqos (class0|class1|class2|class3|class4)]
```

configuration spvx spvcc pnni pmp addparty <PMP SPVC ID>

```
{-partynsap <nsap> [-partyvpi <vpi>-partyvci <vci>]
[-partyid <pid>] [-partyname <name>]
[-ftpnniDtl <dtltag>] [-QoSExpIndex <index>]
```

- configuration spvx spvcc pnni pmp delete <PMP SPVC ID>
- configuration spvx spvcc pnni pmp deleteparty < PMP SPVC ID>< Partyid>

To use this command, enter the following parameters:

```
myswitch::configuration spvx spvcc pnni pmp> batch <file.gz> [-delay <seconds>]
```

These parameters are defined as follows:

Parameter	Description
file.gz	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

12.1.2.3.2 Creating a PNNI Point-to-Multipoint SPVC

This command lets you create a PNNI point-to-multipoint SPVC. The port number, VPI, VCI, and at least one party NSAP address must be entered. Enter the following:



You need to open a session on the destination switch to create a PNNI point-to-multipoint SPVC. This is needed to get the party NSAP address from the destination switch.

The parameters for **new** and **modify** are defined as follows:

Parameter	Description
port	The port number where the permanent portion of the PMP SPVC resides on the source (local) switch fabric.
vpi	The virtual path number for the permanent portion of the PMP SPVC on the source (local) switch fabric.
vci	The virtual channel number for the permanent portion of the PMP SPVC on the source (local) switch fabric.
-priority <priority></priority>	The order in which and the frequency with which you want a PMP SPVC in the down state to be tried for a successful connection. Higher priority PMP SPVCs are tried more often than lower priority SPVCs. All parties within a PMP SPVC have the same priority. The value of lowestpriority (configured under conf spvx spvcc pnni parameters priority lowestpriority), determines the number of times each PMP SPVC is tried before attempting a lower priority PMP SPVC. Valid values are from 1 to lowestpriority, with 1 being the highest priority (the first and the most often tried). The default value is lowestpriority. The value for lowestpriority is defaulted to 10. Point-to-multipoint and point-to-point SPVC priorities are shared. Some PMP or point-to-point SPVCs can be assigned a higher priority compared to other PMP or point-to-point SPVCs. For PMP and point-to-point SPVCs with equal priority, point-to-point SPVCs have higher priority over PMP SPVCs.
-pmpspvccid <index></index>	The index number assigned to this PMP SPVC to identify it uniquely. For PNNI PMP SPVCs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
-fupc <index>1</index>	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this PMP SPVC. To find the index or create a new UPC, use the confupc show command. If no index is specified, the default index of 0 (UBR best effort) is used.
-name <name></name>	An optional name assigned to uniquely identify this PMP SPVC.
-domainid <id></id>	The PNNI domain ID number on the source (local) switch fabric. The default is 1, which is the ID of the default routing domain.
-partynsap <nsap></nsap>	The NSAP address of the various destinations (parties). If the destination switch is running ForeThought 5.3.x or greater, use the conf spvx spvcc pnni destinsap command on the destination switch to obtain the NSAP address. However, if the destination switch is running a pre-ForeThought 5.3.x release, you have to compute the destination NSAP address using the <destprefix:destport> option. See page 29 for more information.</destprefix:destport>
-partyvpi <vpi></vpi>	The virtual path number of the various destinations.
-partyvci <vci></vci>	The virtual channel number of the various destinations.
-partyid <pid></pid>	The index assigned to the destination switch. If an ID is not specified, one will be assigned upon creation of the party. Valid values are between 1 and 2^{15}
-partyname <name></name>	The optional name assigned to this party.

Parameter	Description
-ftpnniDtl <dtlindex></dtlindex>	The FT-PNNI Designated Transit List (DTL) index number, assigned to this PMP SPVC. The DTL specifies the preferred call routing for the SVC portion of the SPVC. Only one DTL can be configured. See Section 12.1.2.4 in this manual for more information. For more information about FT-PNNI DTL hop IDs, see Section 4.4.3.2 in Part 1 of the AMI Configuration Commands Reference Manual.
-QoSExpIndex <index></index>	The index number in the QoS expansion table used to do QoS class-to-parameter expansion when sending the PMP SPVC call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show. The qosindex that is specified for this PMP SPVC must already be configured in the switch. The default is 0.
-bearerClass (X A C)	The requested broadband bearer class for this PMP SPVC. \times is for all types of ATM media. A is for non-ATM CBR media. \subset is for non-ATM VBR, UBR, and ABR media. The default is \times .
-clip <no yes="" =""></no>	Clipping is the loss of a brief interval at the beginning of a speech spurt during speech transmission. no indicates this PMP SPVC is not susceptible to clipping. yes indicates this PMP SPVC is susceptible to clipping. The default is no.
-fqos (class0 class1 class2 class3 class4)	The requested QoS class for this PMP SPVC in the forward (calling to called) direction. The default is class0.

^{1.} The forward UPC contracts that you specify must be compatible with the bearerClass parameter for the PMP SPVC (e.g., all parameters are for VBR traffic or CBR traffic).



If the destination switch is running a pre-ForeThought 5.3.x release, you have to compute the destination NSAP address using the Starting <destprefix:destport> option. with **ForeThought** 5.3.x. the <destprefix:destport> option replaced. If the destination switch is running ForeThought 5.3.x or greater, you should use the <nsap> parameter of specifying the destination. You can use the conf spvx spvcc pnni destination destination switch to obtain the NSAP address to be used with the conf spvx spvcc pnni pmp new command at the source switch.



PMP SPVCs cannot originate or terminate in pre-ForeThought 6.0 switches. However, PMP SPVCs can originate or terminate in transit switches with ForeThought 5.1 or greater. The following is an example of how to create a simple PNNI point-to-multipoint SPVC using the **destnsap** command for each party. This method can only be used if the destination switch is running *ForeThought* 5.3.x or *greater*.

1. Open a session to the destination switch as follows:

```
myswitch::> open 198.29.22.46 private
Opening a session for "198.29.22.46", please wait...
Connected to "198.29.22.46" (asx200bx).
*fishtank::>
```

Run the following command on the destination switch to obtain that switch's NSAP address:

```
*fishtank::> conf spvx spvcc pnni destnsap 1 1d1
Destination Nsap: 0x47.000580ffel000000f2la2ec0.0020480d0211.00
```

3. Go back to the source switch and create a new PNNI point-to-multipoint SPVC. Copy the NSAP address into the <nsap> parameter in the conf spvx spvcc pnni pmp new command:

```
*fishtank::> localhost

myswitch::> conf spvx spvcc pnni pmp new lal 0 100

-partynsap 0x47.000580ffel000000f2la2ec0.0020480d0211.00
```

The following is an example of how to create a PNNI point-to-multipoint SPVC with DTLs using the <nsap> parameter. This method can only be used if the destination switch is running <u>ForeThought 5.3.x</u> or <u>greater</u>.

- 1. Perform steps 1 and 2 from the previous example.

```
*fishtank::> localhost
myswitch::> conf spvx spvcc pnni pmp new la1 0 100
-partynsap 0x47.000580ffe1000000f21a2ec0.0020480d0211.00 -ftpnniDtl 5
```

The following is an example of how to compute the destination NSAP when creating a PNNI point-to-multipoint SPVC. This method should only be used if the destination switch is running a <u>pre-ForeThought 5.3.x</u> release.

- 1. The first 13 bytes of the destination NSAP address are the same as the prefix of the routing domain on the destination switch. Use conf atmr domain show on the destination switch to obtain this prefix.
- 2. The next four bytes of the destination NSAP address is a constant value: 0020480d (given in hexadecimal format).
- 3. The next two bytes of the destination NSAP address depend on the destination port. Each port in a switch has a port identifier that uniquely defines the port. This identifier should be encoded in the next two bytes. Please see Tables A.1 through A.13 in Appendix A in the *ATM Switch Network Configuration Manual* for the port numbering schemes of the various switches.
- 4. For example, the port identifier for port 2b2 on an *ASX*-1000, *ASX*-1200, or *TNX*-1100 (as shown in Table A.3) is 66, which represented using 2 bytes in hexadecimal is 0042.
- 5. The last byte of the destination NSAP address is not significant for routing purposes and can be encoded to zeroes (00).

For example, suppose the destination switch is an *ASX*-1000 switch running *ForeThought* 5.0.x. Its routing domain's prefix is 0x47.0005.80.ffe100.0000.f21a.37fe and the destination port is 3d2. The port identifier for port 3d2 is 139, which is 8b in hexadecimal. The destination NSAP address is computed as follows:

```
<0x47.0005.80.ffe100.0000.f21a.37fe> + <0020480d> + <008b> + <00>
```

which is:

0x47.000580ffe1000000f21a37fe.0020480d008b.00

12.1.2.4 Using DTLs with FT-PNNI Point-to-Multipoint SPVCs

A Designated Transit List (DTL) is a source route which specifies the preferred call routing for the SVC portion of a directed SPVC. Each entry (row) in the DTL represents a single hop in the source route. Currently, DTLs for ATM Forum PNNI PMP SPVCs are not supported, so all references to a DTL for PMP SPVCs correspond to FT-PNNI DTLs.

DTLs are created using the conf atmroute ftpnni dtl new command as described in Section 4.4.3.5 in Part 1 of this manual. A single FT-PNNI DTL can be optionally specified with each party. The DTL is assigned an arbitrary index number which uniquely identifies the DTL. This index number can be applied on a per-party basis using the -ftpnniDtl option under conf spvx spvcc pnni pmp new (or modify).

When a PMP SPVC is created with a DTL index assigned to it, the DTL in the corresponding table is tried. If the user-specified DTL in the table cannot be used, the call can be specifically rerouted for the party by specifying a new DTL or modifying the existing DTL. Failed DTLs are retried periodically.

If a DTL fails, an entry is made in the syslog indicating that the attempt failed, which DTL was tried, and the time at which the failure occurred.

12.1.2.4.1 Modifying a PNNI Point-to-Multipoint SPVC

This command lets you modify an existing PNNI point-to-multipoint SPVC from the source switch. The connection does not go down when changing the priority. However, if the DTL is changed or specified, the currently connected party connection will be torn down and re-established with the new DTL. Enter the following:

```
myswitch::configuration spvx spvcc pnni pmp> modify <PMP SPVCC ID>
    [-priority <priority>]\
    [{<partyid> -ftpnniDtl <dtlindex>}*]

NOTE: * Indicates ONE or more instances of the options.
```

These parameters are defined in Section 12.1.2.2.2.

12.1.2.4.2 Deleting a PNNI Point-to-Multipoint SPVC

This command allows you to delete an existing PNNI point-to-multipoint SPVC from the source switch. Enter the following parameters:

 $\label{eq:myswitch:configuration} $\operatorname{myswitch}:: \operatorname{configuration} \operatorname{spvx} \operatorname{spvcc} \operatorname{pnni} \operatorname{pmp} > \operatorname{delete} $$<\!\operatorname{PMP} \operatorname{SPVCC} \operatorname{ID} \mid \operatorname{PMP} \operatorname{SPVCC} \operatorname{ID} \operatorname{Range}(x-y) > $$$



All parties must be deleted before a PMP SPVC can be deleted.

The following is an example of how to delete a PNNI point-to-multipoint SPVC:

myswitch::configuration spvx spvcc pnni pmp> delete 3428

If a range is specified, all of the point-to-multipoint SPVCs that have a PMP SPVCC ID within that range are deleted. The total number of PMP SPVCs that are deleted is displayed as follows:

myswitch::configuration spvx spvcc pnni pmp> delete 3-10
Total number of PMP SPVCCs deleted : 3

If a PMP SPVCC ID that does not exist is entered, the following error message is returned:

myswitch::configuration spvx spvcc pnni pmp> delete 16451 PERROR: PMP SPVCC does not exist.

These parameters are defined as follows:

Parameter	Description
PMP SPVCC ID	The index number assigned to this PMP SPVC to identify it uniquely. The PMP SPVCC ID is found in the INDEX field under conf spvx spvcc pnni pmp show.
PMP SPVCC ID range (x-y)	Enter the range of index numbers of the PMP SPVCs that you want to delete, separated by a hyphen; e.g., 150-300.

12.1.2.4.3 Adding Parties to a PNNI PMP SPVC

This command lets you add one or more parties to a PMP SPVC. Parties can be added without affecting the data transfer to currently active parties within the existing PMP SPVC. The state of a PMP SPVC changes to up upon successfully establishing a connection to at least one party. Enter the following parameters:

The parameters are defined as follows:

Parameter	Description
<pmp id="" spvc=""></pmp>	The index number assigned to this PMP SPVC to identify it uniquely. The PMP SPVCC ID is found in the INDEX field under conf spvx spvcc pnni pmp show.
-partynsap <nsap></nsap>	The unique NSAP ATM address of the destination switch for a given PMP SPVC.
-partyvpi <vpi></vpi>	The virtual path number of the destination switch for a given PMP SPVC.
-partyvci <vci></vci>	The virtual channel number of the destination switch for a given PMP SPVC.
-partyid <pid></pid>	The index assigned to the destination switch. This is useful when addressing the party in other commands. Party IDs are unique among all the parties for a given PMP SPVC. If a party ID is not specified, it will be assigned upon creation.
-partyname <name></name>	The optional name assigned to uniquely identify the party.
-ftpnniDtl <dtlindex></dtlindex>	The FT-PNNI Designated Transit List (DTL) tag, or index number, assigned to this PMP SPVC party. The DTL specifies the preferred call routing for the SVC portion of the PMP SPVC. Only one DTL can be configured for a party. See Section 12.1.2.4 in this manual for more information.
-QoSExpIndex <index></index>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the PMP SPVC call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show for this number. The qosindex that is specified for this PMP SPVC must already be present in the switch. The default is 0.

12.1.2.4.4 Deleting Parties from a PNNI PMP SPVC

This command lets you delete parties within an existing PMP SPVC. Enter the following parameters:

```
\label{eq:myswitch:configuration} $$ myswitch::configuration spvx spvcc pnni pmp> $$ deleteparty < PMP SPVCC ID> $$ (<PARTYID>)* | <PARTY ID Range(x-y)> | all $$
```

NOTE: * Indicates ONE or more instances of the options (within the braces).



For a PMP PVC with multiple parties, deleting one party does not automatically change the PMP to a PP PVC.

The parameters are defined as follows:

Parameter	Description
<pmp id="" spvcc=""></pmp>	The index number assigned to this PMP SPVC to identify it uniquely. The PMP SPVCC ID is found in the INDEX field under conf spvx spvcc pnni pmp show.
<partyid></partyid>	The index number of the party you want to delete.
<party (x-y)<="" id="" range="" td=""><td>If a range is specified, all parties that have an index within the specified range are deleted.</td></party>	If a range is specified, all parties that have an index within the specified range are deleted.
all	Delete all parties for this PMP SPVC.

12.1.2.4.5 Configuring Rerouting for PNNI Point-to-Multipoint SPVCs

Sometimes PMP SPVCs are forced to use a less than optimal route because of temporary link failures or because of an inconsistent routing database. This command lets you force a re-route when PMP SPVCs that are using less than optimal routes and reroute them if a better route becomes available. For example, for PNNI, a path is considered "better" than another path if its administrative weight is lower by a specified percentage. For FT-PNNI, a path is considered "better" than another path if it has a lower link cost. If a party within a PMP SPVC is currently routed with the DTL specified, the party will not be rerouted. Use the AMI command conf spvx spvcc pnni pmp show advanced to display the current reroute status.

```
myswitch::configuration spvx spvcc pnni pmp> reroute < PMP SPVCC ID> \{ < PARTY ID> \} * | < PARTY ID Range(x-y)> | all NOTE: * Indicates ONE or more instances of the options (within the braces).
```

The parameters are defined as follows:

Parameter	Description
<pmp id="" spvcc=""></pmp>	The index number assigned to this PMP SPVC to identify it uniquely. The PMP SPVCC ID is found in the INDEX field under conf spvx spvcc pnni pmp show.
<partyid></partyid>	The index number of the party you want to reroute.
<party (x-y)<="" id="" range="" td=""><td>If a range is specified, all of the parties that have a party index within the specified range are rerouted.</td></party>	If a range is specified, all of the parties that have a party index within the specified range are rerouted.
all	Reroute all parties in the PMP SPVC that are currently active.

12.1.2.4.6 Displaying a Summary of PNNI Point-to-Multipoint SPVCs

This command allows you to display all of the PNNI PMP SPVCs that originate and terminate on an individual switch fabric. By entering **show**?, you can list the various ways of displaying PNNI PMP SPVC information as follows:

```
myswitch::configuration spvx spvcc pnni pmp> show ?
usage: show [<PMP SPVCC ID>] [<PARTY ID>] [(orig | term)] [(advanced | summary)]
```

These parameters are defined as follows:

Parameter	Description
show	By entering show with no arguments, basic information is displayed for all originating and terminating PMP SPVCs associated with this switch.
PMP SPVCC ID	By entering show with a specific PMP SPVC ID, lists basic information for only that PMP SPVC.

Parameter	Description
PARTY ID	By entering show with a specific party ID, lists basic information for only that PMP SPVC party.
orig	By entering show orig, basic information is displayed for all originating PMP SPVCs associated with this switch.
term	By entering show term, basic information is displayed for all terminating PMP SPVCs associated with this switch.
advanced	By entering show advanced, both basic and advanced information is displayed for the PMP SPVCs specified in the option.
summary	By entering show summary , summary information for a PMP SPVC is displayed. This option is useful for quickly finding out information such as how many and which parties are up and which are down, or the priority of the PMP SPVCs.

12.1.2.4.6.1 Displaying Basic PNNI Point-to-Multipoint SPVC Information

To display basic information about all PNNI PMP SPVCs on this switch, enter the following:

-		_		_	ovx spvcc	pnni pmp>	show					
Origina	ring i	SIMINT	PIMP	SPVCC	S.							
	Sou	rce	(Roo	t)			Dest	inat	tion(s) (Pa	arty	s)
SPVCCID	Port	VPI	VCI	UPC	Status	PartyId	VPI V	VCI	Switch	1	Port	Status
19043	1C4	0	200	0	up	111	any a	any	f21c19	ea (24	down
						222	0	500	f21d1	9ca	2	4 up
						333	0	500	f21e1	9ca	1	б ир
20005	1C3	0	200	0	down	111	any	any	f21c1	9ca	2	4 down
						222	any a	ny f	21d19	ca	24	connecting
						444	any	any	f21a1	765		8 down
Termina	ing E	PNNI	PMP	SPVCs	3:							
	Roo	ot					Party	ys				
SPVCCID	Swi	itch	Port	. VPI	VCI	PartyId	Port	VPI	VCI	Upt	ime	
f200.19a	ad.002	20480	0d008	34.00								
20647	f2001	19ad	16	5 0	200	1	1D1	0	500	1 d	ays.	18:23
						2	1D2	0	500	1 d	ays	16:17
					222	1	1D1	0	400	1 d	ays	0:16

If no PNNI PMP SPVCs have been configured, you receive the following message:

```
myswitch::configuration spvx spvcc pnni pmp> show
PMP SPVCCs are not configured on this switch
```

The fields in this display are defined as follows:

Field	Description
SPVCCID	The index number assigned to this PNNI PMP SPVC by AMI to identify it uniquely from other PNNI SPVCs that have this switch fabric as their source.
Port	The port identifier on the originating switch fabric that contains the permanent portion for this PNNI PMP SPVC.
VPI	The virtual path number used in the permanent portion of this PNNI PMP SPVC on the originating switch fabric.
VCI	The virtual channel number in the permanent portion of this PNNI PMP SPVC on the originating switch fabric.
UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this PNNI PMP SPVC.

Field	Description
Status	The operational state of this PMP SPVC. Can be up or down.
PartyId	The index number assigned to this party for the PMP SPVC.
VPI	The virtual path number of the party.
VCI	The virtual channel number of the party.
Switch	The switch identifier for the terminating switch.
Port	The port identifier of the party.
Status	The operational state of the party. Can be up, down, or connecting
Root SPVCCID	The index number assigned to this PNNI PMP SPVC by AMI to identify it uniquely from other PNNI SPVCs that have this switch fabric as their destination.
Root Switch	The NSAP ATM address for the originating side of the PNNI PMP SPVC.
Root Port	The port identifier on the originating switch fabric that contains the permanent portion for this PNNI PMP SPVC.
Root VPI	The virtual path number used in the permanent portion of this PNNI PMP SPVC on the source switch fabric.
Root VCI	The virtual channel number used in the permanent portion of this PNNI PMP PVC on the source switch fabric.
PartyId	The index number assigned to this party for the PMP SPVC.
Party Port	The port identifier on the terminating switch fabric that contains the permanent portion for this PNNI PMP SPVC, if the destination end is a FORE switch. If the port at the destination switch cannot be determined, a question mark (?) is displayed.
Party VPI	The virtual path number used in the permanent portion of this PNNI PMP SPVC on the destination switch fabric. any means the user did not specify the VPI to be used at the destination.
Party VCI	The virtual channel number used in the permanent portion of this PNNI PMP PVC on the destination switch fabric. any means the user did not specify the VCI to be used at the destination.
Uptime	Displays, in D:HH:MM format, the date and time (in hundredths of a second) since this PNNI PMP SPVC was created or the time since the last successful call setup occurred.

12.1.2.4.6.2 Displaying Advanced PNNI Point-to-Multipoint SPVC Information

To display advanced information about PNNI PMP SPVCs on the source switch, enter the following:

```
myswitch::configuration spvx spvcc pnni pmp> show advanced
Originating PNNI PMP SPVCCs:
             Source(Root)
                                              Destination(s)(Partys)
       SPVCCID Port VPI VCI UPC Status
                                         PartyId VPI VCI Switch Port Status
               1C4 0 200 0
                                 up
                                            111 any any f21c19ca 24
       BearerClass=classX PartyNsap:0x47.0005.80.ffe100.0000.f21c.19ca.0020480d0084.00
       QosClass=class0 FtPnniDtlIndex = none, PartyName = 100Fore, Retry Count=11
       Name = N/A Downtime = 0 days 00:00, RerouteStatus rerouteNotRequested
       Clip=no Last Failure Cause = resource-unavailable-or-unspecified-Cause47
       NoOfParties= 3 OoSExpIndex 0
       Priority=10
                                ----> 222 0 500 f21d19ca
                                                                       up
              PartyNsap: 0x47.0005.80.ffe100.0000.f21d.19ca.0020480d0085.00
              FtPnniDtlIndex = none, Name = 200Fore, Retry Count=0
              Uptime = 0 days 01:20, RerouteStatus rerouteNotRequested
              Last Failure Cause = No Failure.
              OoSExpIndex 0
                                up
       PartyNsap: 0x47.0005.80.ffe100.0000.f21e.19ca.0020480d0086.00
       FtPnniDtlIndex = none, Name = 300Fore, Retry Count=0
       Uptime = 0 days 01:20, Retry Count = 0
       Last Failure Cause = No Failure.
       OoSExpIndex=0
```

The advanced information fields in this display are defined as follows:

Field	Description
SPVCCID	The index number assigned to this PNNI PMP SPVC by AMI to identify it uniquely from other PNNI SPVCs that have this switch fabric as their source.
Port	The port identifier on the originating switch fabric that contains the permanent portion for this PNNI PMP SPVC.
VPI	The virtual path number used in the permanent portion of this PNNI PMP SPVC on the originating switch fabric.
VCI	The virtual channel number in the permanent portion of this PNNI PMP SPVC on the originating switch fabric.
UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this PMP PNNI SPVC.
Status	The state of this PMP SPVC. Can be up or down.
PartyID	The index number assigned to the party.

Field	Description
VPI	The virtual path number of the party.
VCI	The virtual channel number of the party.
Switch	The switch identifier for the destination switch.
Port	The port identifier of the party.
Status	The state of the party. Can be up or down.
BearerClass	The broadband bearer class specified for this PNNI PMP SPVC. Can be classA, classC, or classX.
PartyNSAP	The NSAP ATM address of the PMP SPVC party.
QosClass	Specifies the QOS class-to-parameter expansion when sending the PMP SPVC call set-up message across a PNNI link. Can have a value of 0 to 4. See Chapter 5 for more information on QoS classes.
FtPnniDtlIndex	The Designated Transit List (DTL) index number, assigned to this party. The DTL specifies the preferred call routing for the SVC portion of the SPVC. Only one FT-PNNI DTL can be configured for a party. See Section 12.1.2.4 in this manual for more information.
PartyName	The name assigned to the PMP SPVC party. N/A displays if a name has not be assigned.
Retry Count	Displays the number of times the call setup has been attempted since the PNNI PMP SPVC was created or since the last successful call setup occurred. This is only displayed when the STATE is down.
Uptime	If applicable, shows in HH:MM format, the number of days and time (in hundredths of a second) since this PNNI PMP SPVC was created or the time since the last successful call setup occurred.
Downtime	If applicable, shows in HH:MM format, the number of days and time (in hundredths of a second) since this PNNI PMP SPVC was down
RerouteStatus	Indicates whether rerouting was requested for this PMP SPVC.
Clip	no means this PNNI point-to-point SPVC is not susceptible to clipping and yes means it is susceptible to clipping.
Last Failure Cause	The reason for the last call setup failure for this PNNI point-to-point SPVC. This field is only displayed for originating SPVCs that are down.
NoOfParties	The number of parties in the PMP SPVC.
QoSExpIndex	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the PMP SPVC call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show for this number.
Priority	The order in which and the frequency with which this PMP SPVC is tried for a connection. Higher priority PMP SPVCs are tried more often than lower priority ones. All parties within a PMP SPVC have the same priority. Point-to-multipoint and point-to-point SPVC priorities are shared meaning some PMP or point-to-point SPVCs can be assigned a higher priority compared to other PMP or point-to-point SPVCs. For PMP and point-to-point SPVCs with equal priority, point-to-point SPVCs have higher priority over PMP SPVCs.

12.1.2.4.6.3 Displaying Summary PNNI Point-to-Multipoint SPVC Information

When the **summary** option is specified, the number of parties which are up or down for each PMP SPVC and the priority of the SPVCs is displayed. To display summary information about PNNI PMP SPVCs on a switch, enter the following:

```
myswitch::configuration spvx spvcc pnni pmp> show summary
Originating PMP SPVCs:
           NUMBER OF PARTYS
INDEX
      STATE UP DOWN
            10
19034 Up
                   2
19045
       qU
             15
                   0
*19050 Down 0
                   10
Terminating PMP SPVCs:
INDEX STATE NO. OF PARTYS
15098 Up 10
```

You can also display summary information for just the originating or just the terminating PMP SPVCs as follows:

```
myswitch::configuration spvx spvcc pnni pmp> show orig summary
Originating PNNI PMP SPVCCs:
           NUMBER Of Parties
SPVCCID Status Up Down
   100 up 7 16
              7 16
   110 up
   120 up 7 16
   130 up 7
                    16
myswitch::configuration spvx spvcc pnni pmp> show term summary
Terminating PNNI PMP SPVCCs:
SPVCCID Parties
    2
    3
           4
    4
          4
           4
```

You can also display summary information for an individual PMP SPVC as follows:

```
myswitch::configuration spvx spvcc pnni pmp> show 1 term summary
Terminating PNNI PMP SPVCCs:
SPVCCID Parties
2 4
```

The fields in all of these displays are defined as listed previously for conf spvx spvc pnni pmp show.

12.1.2.5 Configuring PNNI SPVC Parameters

These commands allow you to configure certain PNNI SPVC parameters. Type ? at the pnni level to display the available subcommands.

```
myswitch::configuration spvx spvcc pnni parameters> ?
backoff> pacing> priority> reroute>
lbubr> trapmode
```

12.1.2.5.1 Configuring the DTL Back-off Mechanism for PNNI Point-to-Point SPVCs

These commands let you configure the back-off mechanism for PNNI point-to-point SPVCs. You can display the list of available subcommands by typing? at the backoff level.

```
myswitch::configuration spvx spvcc pnni parameters backoff> ?
interval show
```

12.1.2.5.1.1 Configuring the DTL Back-off Interval for PNNI Point-to-Point SPVCs

This command lets you configure the backoff interval for PNNI point-to-point SPVCs. If the back-off mechanism is enabled under conf spvx spvcc pnni pp new, directed DTLs that fail will be off for the amount of time specified here before they are tried again. This back-off interval allows the network to stabilize before attempting the failed DTL again. See Section 12.1.2.2.2 for more information. Enter the following:

myswitch::configuration spvx spvcc pnni parameters backoff> interval <seconds>

This parameter is defined as follows:

Parameter	Description
interval <seconds></seconds>	The amount of time, in seconds, that failed directed DTLs should be held before they are tried again. This value is used by all point-to-point SPVCs that have the back-off mechanism enabled. (It is enabled by default.) The value must be an integer from 0 to 90,000 (0 - 25 hours). Entering a value of 0 disables the DTL back-off mechanism for all PNNI point-to-point SPVCs. The default is 600 seconds.

12.1.2.5.1.2 Displaying the DTL Back-off Interval for PNNI Point-to-Point SPVCs

This command lets you display the DTL back-off interval for PNNI point-to-point SPVCs. The default is 600 seconds. Enter the following:

myswitch::configuration spvx spvcc pnni parameters backoff> **show** DTL backoff is set to 600 seconds.

12.1.2.5.2 Configuring Pacing for PNNI SPVCs

The pacing parameters under conf spvx spvcc pnni parameters pacing regulate the call setup cycle for SPVCs that are "down" (established, but currently not active). The setup pacing cycle is as follows:

- 1. For all SPVCs in the down state, attempt the <number> of SPVC call setups.
- 2. Pause for <interval> seconds between attempts.

If a switch has a large number of SPVCs configured in its CDB, upon reboot, it tries to establish all the SPVCs. This burst of call requests may place a severe load on the switch resources. Therefore, it is recommended to pace the number of SPVCs so each is serviced properly. The pacing commands let you set the SPVC controller to attempt only the configured number of SPVCs, wait for the specified time interval, and continue if there are more SPVCs to be established. This behavior is true during startup after reboot and retries after a call is in the down state. To display the available subcommands, type ? at the pacing level.

myswitch::configuration spvx spvcc pnni parameters pacing> ?
interval number partypacer show

12.1.2.5.2.1 Setting the PNNI SPVC Pacing Interval

This command allows you to change the interval between call setup attempts for SPVCs that are down. Enter the following parameters:

myswitch::configuration spvx spvcc pnni parameters pacing> interval
<milli-seconds>

CAUTION



If there are a large number of SPVCs originating from this switch, setting a low pacing interval and a high pacing number may put excessive load on the switch. Use caution when configuring a very low pacing interval and a very high pacing number. A pacing interval that is considered low and a pacing number that is considered high depends on your switch's performance numbers (call setups/second). See the *Installation and Maintenance Manual* for your switch for performance specifications.

This parameter is defined as follows:

Parameter	Description
interval <milli-seconds></milli-seconds>	The interval, in milliseconds, between call setup attempts. Values can be from 50 to 300,000 ms. The least significant millisecond value is rounded off. For example a value of 6,788 is converted to 6,780. The default is 2,000 ms.

12.1.2.5.2.2 Setting the Number of PNNI SPVC Calls

This command lets you configure the number of SPVCs that can be setup at one time during an attempt. See above caution statement when configuring the pacing number.

Enter the following parameters:

myswitch::configuration spvx spvcc pnni parameters pacing> number <count>

This parameter is defined as follows:

Parameter	Description
number <count></count>	The number of SPVCs which can be set up at one time during an attempt. Values can be from 1 to 1000. The default is 20 calls.

12.1.2.5.2.3 Setting Pacing for PNNI PMP SPVC Parties

This command lets you control the rate at which parties within a PMP SPVC are setup (activated) during an attempt. Enter the following:

myswitch::configuration spvx spvcc pnni parameters pacing> partypacer <count>

CAUTION



The partypacer value should not exceed the pacing number since this will cause the switch to be overloaded.

This parameter is defined as follows:

Parameter	Description
partypacer <count></count>	The number of parties within a PMP SPVC which can be set up at one time during an attempt. The default is 10 parties.

12.1.2.5.2.4 Displaying the PNNI SPVC Pacing Parameters

This command let you display the parameters that have been set for attempting call setups between PNNI SPVCs that are down. Enter the following:

```
myswitch::configuration spvx spvcc pnni parameters pacing> show
Pacing will setup 20 calls per cycle with 2000 milliseconds between cycles.
For PMP SPVCCs, not more than 10 parties will be setup per call.
NOTE: Each party is considered as a call attempt for pacing purposes.
WARNING: Aggressive values (Large Pacing Numbers & Small Pacing Intervals) may cause the switch to be overloaded.
```

In the above example, two PMP SPVCs, each with 10 parties will be attempted every two seconds.

12.1.2.5.3 Configuring the Priority for PNNI SPVCs

These commands let you configure and display the value of the lowest priority for the -priority <priority> option for the new and modify commands under conf spvx spvcc pnni pp and conf spvx spvcc pnni pmp. To display the available subcommands, type? at the priority level.

```
myswitch::configuration spvx spvcc pnni parameters priority> ?
  lowestpriority show
```

12.1.2.5.3.1 Configuring the Lowest Priority Value for PNNI SPVCs

This command lets you configure the value of lowestpriority for the -priority <priority > option for the new and modify commands under conf spvx spvcc pnni pp and conf spvx spvcc pnni pmp. Enter the following:

myswitch::configuration spvx spvcc pnni parameters priority> lowestpriority
<priority>

This parameter is defined as follows:

Parameter	Description
lowestpriority <priority></priority>	The value that you want to be the lowest value (last tried and least often tried) when determining the order in which and the frequency with which SPVCs are tried for a connection. This value cannot be less than the priority of an existing SPVC and it cannot be greater than 100. The default is 10.

12.1.2.5.3.2 Displaying the Lowest Priority Value for PNNI SPVCs

This command lets you display the value of lowestpriority for the -priority <priority > option for the new and modify commands under conf spvx spvcc pnni pp and conf spvx spvcc pnni pmp. Enter the following:

myswitch::configuration spvx spvcc pnni parameters priority> **show**The lowest priority is 10

12.1.2.5.4 Configuring Rerouting for PNNI Point-to-Point SPVCs

Sometimes SPVCs are forced to use a less than optimal route because of temporary link failures or because of an inconsistent routing database. The commands listed under conf spvx spvcc pnni parameters reroute let you configure the SPVC controller to check for SPVCs that are using less than optimal routes and reroute them if a better route becomes available. For PNNI, a path is considered "better" than another path if its administrative weight is lower by a specified percentage. For ForeThought PNNI, a path is considered "better" than another path if it has a lower link cost. You can display the list of available subcommands by typing ? at the reroute level.

```
myswitch::configuration spvx spvcc pnni parameters reroute> ?
interval number show threshold
```

For point-to-point SPVCs, rerouting parameters regulate whether or not to evaluate periodically the efficiency of the routes used by the point-to-point SPVCs that are up (established and currently active). If enabled, the rerouting cycle is as follows:

- 1. Check the current call routing cost for all point-to-point PNNI SPVCs that are up. (The call routing cost is the sum of all the link costs over the call route (for Fore-Thought PNNI) or the sum of the administrative weight over the call route (for PNNI). The current cost for a particular SPVC can be displayed using conf spvx spvcc pnni pp show advanced.
- Check to see if better (new call routing cost is less by <threshold> percentage)
 routes are available. If not, go to step 3. If so, release the SPVC and reroute
 (attempting to reconnect using the pacing cycle) those that can be improved and
 then go to step 3.
- 3. Pause for <interval> seconds.
- 4. Go to step 1.

12.1.2.5.4.1 Setting the Interval between the Rerouting of PNNI Point-to-Point SPVCs

This command lets you indicate the number of milliseconds between callbacks to the SPVC controller to reroute PNNI point-to-point SPVCs. Enter the following parameters:

```
myswitch::configuration spvx spvcc pnni parameters reroute> interval
<milli-seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <milli-seconds></milli-seconds>	The time interval, in milliseconds, between successive callbacks to the SPVC controller to check for and reroute existing SPVC connections if a better path becomes available. The least significant millisecond value is rounded off. For example, a value of 6,788 is converted to 6,780. The default is $10,000$ ms. The range of valid values is 50 to $3,600,000$ ms, inclusive.

12.1.2.5.4.2 Setting the Number of PNNI Point-to-Point SPVCs to be Rerouted per Interval

At each interval between reroutes, you can check a certain number of the active SPVCs to see if they are using optimal routes. This command lets you determine the number of SPVCs that are analyzed at each interval.

myswitch::configuration spvx spvcc pnni parameters reroute> number <count>

This parameter is defined as follows:

Parameter	Description
number <count></count>	Indicates how many SPVCs that are up, per interval, will be analyzed to determine whether or not those SPVCs need to be rerouted. The default is 20 SPVCs. The range of valid values is 1 to 1000, inclusive.

12.1.2.5.4.3 Displaying PNNI Point-to-Point SPVC Reroute Information

This command lets you display information about PNNI point-to-point SPVC rerouting. Enter the following parameters:

myswitch::configuration spvx spvcc pnni parameters reroute> show

Rerouting analyzes 20 calls per cycle with 10000 milliseconds between cycles.

The new call routing cost must show a 50 percent improvement over the current call routing cost before the call is rerouted.

12.1.2.5.4.4 Setting the Improvement Threshold for Rerouting

This command lets you configure the routing cost improvement percentage against which the SPVCs are analyzed to see if there is a better route available. Enter the following parameters:

myswitch::configuration spvx spvcc pnni parameters reroute> threshold ter

This parameter is defined as follows:

Parameter	Description
threshold <percent></percent>	The minimum percentage improvement in the cost that the new SPVC path must have over the current SPVC path before a reroute is performed. The default value is 50 percent. The range of valid values is 1 to 99, inclusive.

12.1.2.5.5 Configuring the Default Load-balanced UBR Bandwidth for SPVCs

These commands let you configure the default estimated bandwidth value, in cells per second, for individual UBR SPVCs. You can display the list of available subcommands by typing at the 1bubr level.

12.1.2.5.5.1 Assigning the Default Load-balanced UBR Bandwidth for SPVCs

This command lets you assign a default estimated bandwidth value, in kilocells per second, for individual UBR SPVCs. This value is used by the load-balanced UBR routing feature under conf atmr ftpnni lbubr. See Section 4.3.1 in Part 1 of this manual for more information about load-balanced UBR routing. Enter the following parameters:

 $\verb|myswitch|::configuration spvx spvcc pnni parameters | | bubr>| | \textbf{defaultbandwidth}| < |kcps>|$

This parameter is defined as follows:

Parameter	Description
<kcps></kcps>	The default estimated bandwidth value, in kilocells per second, to be used when calculating load-balanced UBR routing. The value must be an integer from 0 to 65534. The default is 1 kcps $(0.424 \ \mathrm{Mbps})$.

12.1.2.5.5.2 Displaying the Default Load-balanced UBR Bandwidth for SPVCs

This command lets you display the default estimated bandwidth value for individual UBR SPVCs. This value is used by the load-balanced UBR routing feature under conf atmr ftpnni lbubr. See Section 4.3.1 in Part 1 of this manual for more information about load-balanced UBR routing. Enter the following:

```
myswitch::configuration spvx spvcc pnni parameters lbubr> show
The default Estimated UBR Bandwidth is 1 Kilo Cells/Sec
```

12.1.2.5.6 Configuring Enhanced SPVC Traps

In previous *ForeThought* releases, an <code>spvcRerouteInitiated</code> trap (number 1090) is sent whenever an SPVC is torn down and rerouted because a more optimal route has become available. This command gives you more flexibility to configure which trap(s) should be sent, on a per-switch basis, when an SPVC is set up or torn down. Enter the following:



These SPVC traps are generated only by the source of an SPVC. The destination side of an SPVC does not generate any traps.

The existing spvcRerouteInitiated trap is still available. The following list describes the new SPVC traps that are available.

 $\textbf{pnniSpvccDown} \qquad \text{This trap is sent when an SPVC is torn down because}$

a better route has become available or because a network failure occurred. This trap is not sent when

an SPVC is deleted.

pnniSpvccUp This trap is sent when an SPVC is established.

pnniSpvccFail This trap is sent when an SPVC fails to establish after

16 consecutive attempts.



When any of these traps or the existing spvcRerouteInitiated trap is sent, a corresponding LOG_NOTICE level message is sent to the syslog.

myswitch::configuration spvx spvcc pnni parameters> trapmode
[(reroute | failure | none | all)]

These parameters are defined as follows:

Parameter	Description
reroute	Indicates an spvcRerouteInitiated trap will be sent when an SPVC is torn down because a better route has become available or because a network failure has occurred. This is the default.
failure	Indicates a pnniSpvccFail trap will be sent if a call cannot be established after 16 consecutive attempts. A pnniSpvccUp trap is sent if a call is established that has previously sent a pnniSpvccFail trap.
none	Indicates no SPVC traps will be sent.
all	Indicates a pnniSpvccDown trap will be sent (instead of the spvcRerouteInitiated trap) when an SPVC is torn down because a better route has become available or because a network failure has occurred. A pnniSpvccFail trap is sent if a call cannot be established after 16 consecutive attempts. A pnniSpvccUp trap is sent when a call is established.

To display the current trapmode, type trapmode and press <ENTER>:

myswitch::configuration spvx spvcc pnni parameters> trapmode
SPVC trap mode is : reroute

12.1.2.6 Displaying the BNP Notation for a Port Identifier

The destination port of originating PMP/PP SPVCs and PP SPVPs and the source port of terminating PMP/PP SPVCs and PP SPVPs is displayed as a port identifier (e.g., 0). If the destination port for an originating PMP/PP SPVC is displayed as the port identifier x, you can convert this to BNP form by entering this command at the destination switch with x as the cportidentifier>. For a terminating PMP/PP SPVC, enter this command on the originating switch to convert the source port identifier to its BNP format. Enter the following:

```
myswitch::configuration spvx spvcc pnni> porttobnp <portidentifier>
```

This parameter is defined as follows:

Parameter	Description
<pre><portidentifier></portidentifier></pre>	The port identifier that you want to convert to BNP notation.

For example, suppose you have a point-to-point SPVC that originates on an ASX-1000 named shark and terminates on an ASX-4000 named fishtank. If you enter conf spvx spvcc pnni pp show on shark, a value of 0 might be displayed for the port on the destination end (fishtank) as follows:

To convert the destination port value of 0 to BNP, log into fishtank and enter the conf spvx spvcc pnni porttobnp command with 0 as the parameter.

```
fishtank::>conf spvx spvcc pnni porttobnp 0
Port identifier 0 is port 1A1
```

The output indicates that the BNP value is 1A1. This command can also be used in the same way for terminating SPVCs.

12.2 SPVPC Configuration Commands

These commands allow you to configure Smart Permanent Virtual Path Connections (SPVPCs, hereafter to referred to as SPVPs). An SPVP is a path that goes across multiple switch fabrics. An SPVP looks like a PVP at the local and remote endpoints with a Switched Virtual Path (SVP) in the middle. SPVPs are more robust than PVPs. If an SPVP goes down and there is an alternate route, then the end switch fabrics of the SPVP automatically reroute the SPVP around the failed link.



SVPs and SPVPs are supported in ATM Forum PNNI networks, but are not supported in *ForeThought* PNNI networks. Also, point-to-multipoint SVPs and SPVPs are not supported.

To display the list of available subcommands, type? at the spvpc level.

12.2.1 Batch Command for SPVPCs

This command lets you create or delete a large number of SPVPs by executing an AMI command script that resides on the FLASH. This same command also exists under conf vcc, conf spvx spvcc pnni pp, and conf spvcx spvcc pnni pmp. To use this command, do the following:

Create an ASCII text script file on a host. This file should list all of the new commands or delete commands in the order in which you wish to create or delete the paths.



When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter configuration instead of just conf.

- 2. Compress the script file with the gzip utility.
- 3. Load the script file on to the switch using the command oper flash get <host:remotefile><localfile>.
- 4. Use the command conf spvx spvpc batch <file.gz> [-delay <seconds>] to execute the script on the switch. This command sequentially executes every SPVP command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second SPVP with a particular VPI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- configuration upc new <index> ubr [aa15 [noPktDisc]] [ubrTagging] [-name <name>]
- configuration upc delete <index>
- configuration vpt new <port> <vpi>[(term | orig)] [-minvci <vci>]
 [-maxvci <vci>]
- configuration vpt delete <port> <vpi>[(term | orig)]
- configuration vcc new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci> [-upc <index>]
 [-name <name>]
- configuration vcc delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
- configuration spvx spvpc new <port> <vpi> <destnsap>

```
[-priority <priority>]
-spvpcid <index>
[-name <name>] [-destvpi <vpi>]
[-reroute (enable|disable)]
[-fupc <index>] [-bupc <index>]
[-autoDtl (enable|disable)] \
[-backoff (enable | disable)] \
[-dtlTag <tag>] \
[-clip <no|yes>] \
[-QoSExpIndex <index>] \
[-fqos (class0|class1|class2|class3|class4)] \
[-bqos (class0|class1|class2|class3|class4)]
```

• configuration spvx spvpc delete <SPVPC ID | SPVPC ID range (x-y)>

To use this command, enter the following parameters:

```
myswitch::configuration spvx spvpc> batch <file.qz> [-delay <seconds>]
```

These parameters are defined as follows:

Parameter	Description
file.gz	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

12.2.2 Obtaining a Destination NSAP for an SPVPC

This command is used at the destination switch to obtain the NSAP address to be used as the <destnsap> option under the conf spvx spvpc new command at the source switch. Enter the following parameters:

myswitch::configuration spvx spvpc> destnsap <domainid> <port>

These parameters are defined as follows:

Parameter	Description
<domainid></domainid>	The PNNI domain ID number on the destination switch fabric. The prefix corresponding to that routing domain is used to compute the destination NSAP address. For a list of valid domain identifiers use the conf atmr domain show command.
<port></port>	The port on which the permanent portion of the SPVPC needs to terminate on the destination switch.

For example:

myswitch::configuration spvx spvpc> destnsap 1 1d1
Destination Nsap : 0x47.000580ffel000000f2la2ec0.0020480d0211.00

12.2.3 Creating an SPVPC

This command lets you create an SPVP. Enter the following parameters:



You do not need to open a session to the destination switch to create an SPVP because all SPVPs are bidirectional.

These parameters are defined as follows:

Parameter	Description
SPVPC ID or <spvpcid> or -spvpcid <index></index></spvpcid>	The index number assigned to this SPVP to identify it uniquely. For SPVPs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
port	The port number where the permanent portion of the SPVP resides on the source (local) switch fabric.
vpi	The virtual path number for the permanent portion of the SPVP on the source (local) switch fabric.
destnsap	The ATM NSAP address of the destination (remote) switch for this SPVP.
-priority <priority></priority>	The order in which and the frequency with which you want this SPVP to be tried for a connection. Higher priority SPVPs are tried more often than lower priority ones. The value of lowestpriority determines the number of times each SPVP is tried before attempting a lower priority SPVP. Valid values are from 1 to lowestpriority, with 1 being the highest priority (the first tried) and with lowestpriority being the value configured under conf spvx spvpc parameters priority lowestpriority. The default value is half of the value of lowestpriority, rounded off to the lowest integer. The value for lowestpriority is defaulted to 10.
-domainid <id></id>	The PNNI domain ID number on the source (local) switch fabric. The default is 1, which is the ID of the default routing domain.

Parameter	Description
-name <name></name>	An optional name for the user to assign to this SPVP to help uniquely identify it.
-destvpi <vpi></vpi>	The virtual path number on the destination switch fabric for this SPVP. If this option is not used, the destination switch uses any available value.
-reroute (enable disable)	enable indicates that this SPVP will be examined periodically to see if it is using a sub-optimal route. If it is, it will be rerouted using a better route if configured using confspvx spvpc parameters reroute. disable indicates that this SPVP will not be examined periodically to see if it is using a sub-optimal route. The default state for SPVPs is enable.
-fupc <index></index>	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this SPVP. To find the index you want, use the conf upc show command. If no index is specified, the default index of 0 (UBR best effort) is used.
-bupc <index>1</index>	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index assigned to this SPVP. To find the index you want, use the conf upc show command. If no index is specified, the default index of 0 (UBR best effort) is used.
-autoDtl (enable disable)	enable means dynamic path computation is used to route an SPVP when all of the configured DTLs fail. disable means dynamic path computation is not used to route an SPVP when all of the configured DTLs fail. This feature applies to both FT-PNNI and PNNI DTLs. The default is enable. This flag does not apply when no DTLs are configured.
-backoff (enable disable)	enable means the back-off mechanism is used for this SPVP. Upon a failure, the failed directed DTL is not retried until the amount of time specified under conf spvx spvcc pnni parameters backoff interval has elapsed. This allows old information to age out. disable means the back-off mechanism is not used for this SPVP and directed DTLs that are configured for this SPVP are retried continually even after a failure. The default is enable. See Section 12.1.2.4 for more information.
-dtlTag <tag></tag>	The Designated Transit List (DTL) tag, or index number, assigned to this SPVP which corresponds to a list of preferred DTLs that you configure under conf atmr dtltable. The DTL specifies the preferred call routing for the SVP portion of the SPVP.
-clip <no yes="" =""></no>	During speech transmission, clipping is the loss of a brief interval at the beginning of a speech spurt. no indicates this SPVP is not susceptible to clipping. Yes indicates this SPVP is susceptible to clipping. The default is no.
-QoSExpIndex <index></index>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVP call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show for this number. The qosindex that is specified for this SPVP must already be present in the switch. The default is 0.
-fqos (class0 class1 class2 class3 class4)	The requested QoS class for this SPVP in the forward (calling to called) direction. The $-\texttt{fqos}$ and $-\texttt{bqos}$ options must be either both class0 or both a non-zero class. The default is $\texttt{class0}$.
-bqos (class0 class1 class2 class3 class4)	The requested QoS class for this SPVP in the backward (called to calling) direction. The $-\texttt{fqos}$ and $-\texttt{bqos}$ options must be either both class0 or both a non-zero class. The default is $\texttt{class0}$.

Packet discard and partial packet policing are not supported on SPVPs. Therefore, even if the forward and/or backward UPC specifies one or both of these options, the options are considered disabled.



When creating an SPVP, the -fqos and -bqos options must be either both class0 or both a non-zero class. For example, the -fqos cannot be class0 and the -bqos be class1. This combination is invalid. Having an -fqos of class0 and a -bqos of class0 is a valid combination, and having an -fqos of class1 and a -bqos of class4 is a valid combination, but having an -fqos of class2 and a -bqos of class0 is not valid.



SPVPs can only be set up over PNNI links. They cannot be set up over FT-PNNI links.

The following is an example of how to create a simple PNNI SPVP.

1. Open a session to the destination switch as follows:

```
myswitch::> open 198.29.22.46 private
Opening a session for "198.29.22.46", please wait...
Connected to "198.29.22.46" (asx200bx).
*fishtank::>
```

2. Run the following command on the destination switch to obtain that switch's NSAP address:

```
*fishtank::> conf spvx spvpc destnsap 1 1d1
Destination Nsap : 0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

3. Go back to the source switch and create a new PNNI SPVP. Copy the NSAP address into the command for the *<destnsap>* parameter:

```
*fishtank::> localhost
myswitch::> conf spvx spvpc new la1 0 100
0x47.000580ffe1000000f21a2ec0.0020480d0211.00
```

12.2.3.1 Using DTLs with PNNI SPVPs

ATM Forum PNNI DTLs are created using the conf atmr pnni dtl new command as described in Section 4.4.7.5 in Part 1 of this manual. A DTL is a source route (uniquely identified by a pair of indices: nodeindex and dtlindex) which specifies the preferred call routing for the SVP portion of a directed SPVP. Each entry (row) in the DTL represents a single hop in the source route.

Once you have created the DTLs, you can create a table (list of DTLs) using the conf atmrdtltable new command. (See Chapter 4 in Part 1 of this manual for more information about this command.) In this table, each DTL is assigned a weight which indicates the priority in which the DTLs are tried, with the highest weight being the first one tried. The weights are arbitrary (e.g., 10, 20, 30, and 40). You can even assign two or more DTLs with the same weight. The table is also assigned an arbitrary tag number which uniquely identifies the table. This tag can be applied on a per PNNI SPVP basis using the -dtlTag option under conf spvx spvpc new (or modify). Multiple SPVPs can use the same DTL tag table.

When an SPVP is created with a DTL tag assigned to it, the DTL in the corresponding table with the highest weight is tried first. If this DTL is unusable, the DTL with the next highest weight is tried. This process is repeated until a DTL in that table is found that provides a route to the destination which satisfies the QoS requirements.

If none of the user-specified DTLs in the table can be used, and if the <code>-autoDtl</code> option under <code>conf spvx spvpc new</code> (or <code>modify</code>) is set to <code>enable</code>, the call is dynamically routed if an alternative path can be computed. If that option is set to <code>disable</code>, then the call setup fails, but the DTLs are retried periodically.

If any of the DTLs fail, an entry is made in the syslog which indicates that the attempt failed, which DTL was tried, and the time at which the failure occurred. Also, when a DTL fails, a back-off mechanism is used to determine when to retry that particular DTL. The DTL is not attempted for a user-configured interval in order to allow any old information to age out and allow the network to stabilize. This interval is set under conf spvx spvpc parameters backoff interval <seconds>. However, you can enable or disable this back-off mechanism on a per-SPVP basis using the -backoff option under conf spvx spvpc new (or modify). The default setting is enable. If you disable this mechanism, then instead of waiting for the user-configured back-off interval after a failure, the DTLs are retried at every reroute interval. If the -backoff option is changed using the modify command on an existing SPVP, the remaining waiting period for any failed DTLs is cleared and the DTLs are attempted again.

Once an SPVP is established, if the -reroute option under conf spvx spvpc new (or modify) is set to enable, the SPVP is checked periodically to see that the most preferred route is being used. If it is not being used, an attempt is made to re-establish the circuit using a DTL with a higher weight. If this succeeds, but not with the designated most preferred route, this process is continued until the SPVP is using the designated most preferred route. DTLs with equal weights are ignored on a retry once an SPVP is established with a given weight.

12.2.4 Modifying an SPVPC

This command lets you modify the priority of an existing SPVP from the source end. Enter the following:

```
myswitch::configuration spvx spvpc> modify <spvpcid> \
[-priority <priority>]\
[-reroute <priority>]\
[-dtlTag <tag>]\
[-autoDtl (enable|disable)]\
[-backoff (enable|disable)]\
```

These parameters are defined as follows:

Parameter	Description
<spvpcid></spvpcid>	The index number assigned to this SPVP to identify it uniquely. For SPVPs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
-priority <priority></priority>	The order in which and the frequency with which you want this SPVP to be tried for a connection. Higher priority SPVPs are tried more often than lower priority ones. The value of lowestpriority determines the number of times each SPVP is tried before attempting a lower priority SPVP. Valid values are from 1 to lowestpriority, with 1 being the highest priority (the first tried) and with lowestpriority being the value configured under conf spvx spvpc parameters priority lowestpriority. The default value is half of the value of lowestpriority, rounded off to the lowest integer. The value for lowestpriority is defaulted to 10.
-reroute (enable disable)	enable indicates that this SPVP will be examined periodically to see if it is using a sub- optimal route. If it is, it will be rerouted using a better route if specified in conf spvx spvpc parameters reroute. disable indicates that this SPVP will not be examined periodically to see if it is using a sub-optimal route. The default state for SPVPs is enable.
-dtlTag <tag></tag>	The Designated Transit List (DTL) tag, or index number, assigned to this SPVP which corresponds to a DTL table that you configure under conf atmr dtltable. The DTL specifies the preferred call routing for the SVP portion of the SPVP.
-autoDtl (enable disable)	enable means dynamic path computation is used to route an SPVP when all of the configured DTLs fail. disable means dynamic path computation is not used to route an SPVP when all of the configured DTLs fail. The default is enable. This flag does not apply when no DTL are configured.
-backoff (enable disable)	enable means the back-off mechanism is used for this SPVP. Upon a failure, the failed directed DTL is not retried until the amount of time specified under conf spvx spvcc pnni parameters backoff interval has elapsed. This allows old information to age out and allow the network to stabilize. disable means the back-off mechanism is not used for this SPVP and directed DTLs that are configured for this SPVP are retried continually even after a failure. The default is enable. See Section 12.1.2.4 for more information.

12.2.5 Deleting an SPVPC

This command allows you to delete an existing SPVP from the source end. Enter the following parameters:

```
myswitch::configuration spvx spvpc> delete \langle SPVPC \ ID \ | \ SPVPC \ ID \ range \ (x-y)>
```

The following is an example of how to delete a SPVP:

```
myswitch::configuration spvx spvpc> delete 3428
```

If a range is specified, all of the SPVPs that have an SPVPC ID within that range are deleted. The total number of SPVPs that are deleted is displayed as follows:

```
myswitch::configuration spvx spvpc> delete 5-25
Total number of SPVPCs deleted : 6
```

If you enter an SPVPC ID that does not exist, the following error message is returned:

```
myswitch::configuration spvx spvpc> delete 16451
?ERROR: PNNI SPVPC 16451 does not exist
```

The parameters for delete are defined as follows:

Parameter	Description
SPVPC ID	The index number assigned to this SPVPC to identify it uniquely. The SPVPC ID is found in the INDEX field under conf spvx spvpc show.
SPVPC ID range (x-y)	Enter the range of index numbers of the SPVPCs that you want to delete, separated by a hyphen; e.g., 150-300.

12.2.6 Configuring SPVPC Parameters

These commands allow you to configure certain PNNI SPVPC parameters. Type ? at the parameters level to display the available subcommands.

```
myswitch::configuration spvx spvpc parameters> ?
  backoff> pacing> priority> reroute>
  trapmode
```

12.2.6.1 Configuring the Back-off Mechanism for SPVPCs

These commands let you configure the back-off mechanism for SPVPs. You can display the list of available subcommands by typing? at the backoff level.

```
myswitch::configuration spvx spvpc parameters backoff> ?
interval show
```

12.2.6.1.1 Configuring the Back-off Interval for SPVPs

This command lets you configure the back-off interval for SPVPs. If the back-off mechanism is enabled under conf spvx spvpc new, directed DTLs that fail will be off for the amount of time specified here before they are tried again. This back-off interval allows the network to stabilize before attempting the failed DTL again. See Section 12.2.3 for more information. Enter the following:

```
myswitch::configuration spvx spvpc parameters backoff> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds></seconds>	The amount of time, in seconds, that failed directed DTLs should be held before they are tried again. This value is used by all SPVPs that have the back-off mechanism enabled. (It is enabled by default.) The value must be an integer from 0 to 90,000 (0 - 25 hours). Entering a value of 0 disables the DTL back-off mechanism for SPVPs. The default is 600 seconds.

12.2.6.1.2 Displaying the Back-off Interval for SPVPs

This command lets you display the back-off interval for SPVPs. Enter the following:

```
myswitch::configuration spvx spvpc parameters backoff> show DTL backoff is set to 600 seconds.
```

12.2.6.2 Configuring Pacing for SPVPCs

If a switch has a large number of SPVPs configured in the CDB, it tries to open the SPVPs all at once when it reboots. Therefore, it is advantageous to pace the number of SPVPs that are opened at once, so that each is serviced properly. This command lets you set the SPVP controller to open only the configured number of SPVPs and to schedule itself for callback after the specified time interval if there are more SPVPs to be opened, both at start up and at the retry callback. To display the available subcommands, type ? at the pacing level.

```
myswitch::configuration spvx spvpc parameters pacing> ?
interval number show
```

The pacing parameters under conf spvx spvpc parameters pacing regulate the call setup cycle for SPVPs that are "down" (established, but currently not active). The pacing cycle is as follows:

- 1. For all SPVPs in the down state, attempt the <number> of SPVP call setups.
- 2. Pause for <interval> seconds between attempts.
- 3. If unsuccessful, go to step 1.

12.2.6.2.1 Setting the SPVPC Pacing Interval

This command allows you to change the interval between call setup attempts for SPVPs that are down. Enter the following parameters:

myswitch::configuration spvx spvpc parameters pacing> interval <milli-seconds>

This parameter is defined as follows:

Parameter	Description
interval <milli-seconds></milli-seconds>	The interval, in milliseconds, between call setup attempts. Values can be from 50 to 300,000 ms. The least significant millisecond value is rounded off. For example a value of 6,788 is converted to 6,780. The default is 2,000 ms.

12.2.6.2.2 Setting the Number of SPVPC Calls

This command lets you configure the number of SPVPs that can be set up at one time during an attempt. Enter the following parameters:

myswitch::configuration spvx spvpc parameters pacing> number <count>

This parameter is defined as follows:

Parameter	Description
number <count></count>	The number of SPVPs which can be set up at one time during an attempt. Values can be from 1 to 1000. The default is 20 calls.

12.2.6.2.3 Displaying the SPVP Pacing Parameters

This command lets you display the parameters that have been set for attempting call setups between SPVPs that are down. Enter the following parameters:

```
myswitch::configuration spvx spvpc parameters pacing> show
Pacing will setup 20 calls per cycle with 2000 milliseconds between cycles.
```

12.2.6.3 Configuring the Priority for SPVPCs

These commands let you configure and display the value of the lowest priority for the -priority <pri>priority <pri>priority > option under conf spvx spvpc new and modify. To display the available subcommands, type ? at the priority level.

```
myswitch::configuration spvx spvpc parameters priority> ?
  lowestpriority show
```

12.2.6.3.1 Configuring the Lowest Priority Value for PNNI SPVCs

This command lets you configure the value of lowestpriority for the -priority <priority> option under conf spvx spvpc new and modify. Enter the following:

```
myswitch::configuration spvx spvpc parameters priority> lowestpriority
<priority>
```

This parameter is defined as follows:

Parameter	Description
lowestpriority <priority></priority>	The value that you want to be the lowest value (last tried and least often tried) when determining the order in which and the frequency with which SPVPs are tried for a connection. This value cannot be less than the priority of an existing SPVP and it cannot be greater than 100. The default is 10.

12.2.6.3.2 Displaying the Lowest Priority Value for PNNI SPVCs

This command lets you display the value of lowestpriority for the -priority <priority> option under conf spvx spvpc new and modify. Enter the following:

```
myswitch::configuration spvx spvpc parameters priority> show
The lowest priority is 10
```

12.2.6.4 Configuring Rerouting for SPVPCs

Sometimes SPVPs are forced to use a less than optimal route because of temporary link failures or because of an inconsistent routing database. This command lets you configure the SPVP controller to check for SPVPs that are using less than optimal routes and reroute them if a better route becomes available. For PNNI, a path is considered "better" than another path if its administrative weight is lower by a specified percentage. You can display the list of available subcommands by typing ? at the reroute level.

```
myswitch::configuration spvx spvpc parameters reroute> ?
interval number show threshold
```

Rerouting parameters regulate whether or not to evaluate periodically the efficiency of the routes used by the SPVPs that are up (established and currently active). If enabled, the rerouting cycle is as follows:

- Check the current call routing cost for all SPVPs that are up. (The call routing cost
 is the sum of all the link costs over the sum of the administrative weight over the
 call route (for PNNI). The current cost for a particular SPVP can be displayed using
 conf spvx spvpc show advanced.)
- 2. Check to see if better (new call routing cost is less by *<threshold>* percentage) routes are available. If not, go to step 3. If so, release the SPVP and reroute (attempting to reconnect using the pacing cycle) those that can be improved and then go to step 3.
- 3. Pause for <interval> seconds.
- 4. Go to step 1.

12.2.6.4.1 Setting the Interval between the Rerouting of SPVPCs

This command lets you indicate the number of milliseconds between callbacks to the SPVP controller to reroute SPVPs. Enter the following parameters:

myswitch::configuration spvx spvpc parameters reroute> interval <milli-seconds>

This parameter is defined as follows:

Parameter	Description
interval <milli-seconds></milli-seconds>	The time interval, in milliseconds, between successive callbacks to the SPVP controller to check for and reroute existing SPVPs if a better route becomes available. The least significant millisecond value is rounded off. For example, a value of 6,788 is converted to 6,780. The default is 15,000 ms. The range of valid values is 50 to 3,600,000 ms, inclusive.

12.2.6.4.2 Setting the Number of SPVPCs to be Rerouted per Interval

At each interval between reroutes, you can check a certain number of the active SPVPs to see if they are using optimal routes. This command lets you determine the number of SPVPs that are analyzed at each interval.

myswitch::configuration spvx spvpc parameters reroute> number <count>

This parameter is defined as follows:

Parameter	Description
number <count></count>	Indicates how many up SPVPs, per interval, will be analyzed to determine whether or not those SPVPs need to be rerouted. The default is 15 SPVPs.

12.2.6.4.3 Displaying PNNI SPVPC Reroute Information

This command lets you display information about SPVP rerouting. Enter the following parameters:

myswitch::configuration spvx spvpc parameters reroute> show

Rerouting analyzes 15 calls per cycle with 15000 milliseconds between cycles.

The new call routing cost must show a 75 percent improvement over the current call routing cost before the call is rerouted.

12.2.6.4.4 Setting the Improvement Threshold for Rerouting

This command lets you configure the routing cost improvement percentage against which the SPVPs are analyzed to see if there is a better route available. Enter the following parameters:

myswitch::configuration spvx spvpc parameters reroute> threshold <percent>

This parameter is defined as follows:

Parameter	Description
threshold <percent></percent>	The minimum percentage improvement in the cost that the new SPVP must have over the current SPVP before a reroute is performed. The default value is 75 percent. The range of valid values is 1 to 99, inclusive.

12.2.6.5 Configuring Enhanced SPVC Traps

In previous *ForeThought* releases, an spvcRerouteInitiated trap (number 1090) is sent whenever an SPVP is torn down and rerouted because a more optimal route has become available. This new command gives you more flexibility to configure which trap(s) should be sent, on a per-switch basis, when an SPVP is set up or torn down. Enter the following:



These SPVP traps are generated only by the source of an SPVP. The destination side of an SPVP does not generate any traps.

The existing <code>spvcRerouteInitiated</code> trap is still available. The following list describes the new SPVP traps that are available.

pnniSpvpcDown

This trap is sent when an SPVP is torn down because a better route has become available or because a network failure occurred. This trap is not sent when

an SPVP is deleted.

pnniSpvpcUp

This trap is sent when an SPVP is established.

pnniSpvpcFail

This trap is sent when an SPVP fails to establish after

16 consecutive attempts.



When any of these traps or the existing spvcRerouteInitiated trap is sent, a corresponding LOG_NOTICE level message is sent to the syslog.

myswitch::configuration spvx spvpc parameters> trapmode
[(reroute | failure | none | all)]

Parameter	Description
reroute	Indicates an spvcRerouteInitiated trap will be sent when an SPVP is torn down because a better route has become available or because a network failure has occurred. This is the default.
failure	Indicates a pnniSpvpcFail trap will be sent if a call cannot be established after 16 consecutive attempts. A pnniSpvpcUp trap is sent if a call is established that has previously sent a pnniSpvpcFail trap.
none	Indicates no SPVC traps will be sent.
all	Indicates a pnniSpvpcDown trap will be sent (instead of the spvcRerouteInitiated trap) when an SPVC is torn down because a better route has become available or because a network failure has occurred. A pnniSpvpcFail trap is sent if a call cannot be established after 16 consecutive attempts. A pnniSpvpcUp trap is sent when a call is established.

To display the current trapmode, type trapmode and press <ENTER>:

```
myswitch::configuration spvx spvpc parameters> trapmode
SPVC trap mode is : reroute
```

12.2.7 Displaying the BNP Notation for a Port Identifier

The destination port of originating SPVCs and SPVPs and the source port of terminating SPVCs and SPVPs is displayed as a port identifier (e.g., 0). If the destination port for an originating SPVP is displayed as the port identifier x, you can convert this to BNP form by entering this command at the destination switch with x as the *<portification switch*. For a terminating SPVP, enter this command on the originating switch to convert the source port identifier to its BNP format. Enter the following:

```
myswitch::configuration spvx spvpc> porttobnp <portidentifier>
```

This parameter is defined as follows:

Parameter	Description
<pre><portidentifier></portidentifier></pre>	The port identifier that you want to convert to BNP notation.

For example, suppose you have an SPVP that originates on an ASX-1000 named shark and terminates on an ASX-4000 named fishtank. If you enter conf spvx spvpc show on shark, a value of 0 might be displayed for the port on the destination end (fishtank) as follows:

To convert the destination port value of 0 to BNP, log into fishtank and enter the **conf spvx spvpc porttobnp** command with 0 as the parameter.

```
fishtank::>conf spvx spvpc porttobnp 0
Port identifier 0 is port 1A1
```

The output indicates that the BNP value is 1A1. This command can also be used in the same way for terminating SPVPs.

12.2.8 Displaying SPVP Information

This command allows you to display all of the SPVPs that originate and terminate on an individual switch fabric. By entering show ?, you can list the various ways of displaying SPVP information as follows:

```
myswitch::configuration spvx spvpc> show ?
usage: show [<spvpcid>] [(orig | term)] [(advanced | summary)]
```

These parameters are defined as follows:

Parameter	Description
show	By entering show with no arguments, basic information is displayed for all originating and terminating SPVPs associated with this switch.
spvpcid	By entering show with a specific <i><spvpcid></spvpcid></i> , lists basic information for only that SPVP.
orig	By entering show with orig, basic information is displayed for all originating SPVPs associated with this switch.
term	By entering show with term, basic information is displayed for all terminating SPVPs associated with this switch.
advanced	By entering show with advanced, both basic and advanced information is displayed for the SPVPs specified in the option.
summary	By entering show with summary, only the first line of basic information is displayed for each SPVP. This option is useful for quickly finding out information such as which SPVPs are up and which are down, or the priority of the SPVPs.

12.2.8.1 Displaying Basic SPVP Information

To display basic information about all SPVPs on this switch, enter the following:

The fields in this display are defined as follows:

Field	Description
Source INDEX	The index number assigned to this SPVP by AMI to identify it uniquely from other SPVPs that have this switch fabric as their source.
Source PORT	The port identifier on the originating switch fabric that contains the permanent portion for this SPVP.
Source VPI	The virtual path number used for the through path in the permanent portion of this SPVP on the originating switch fabric.
Source UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this SPVP.
Source	The NSAP ATM address for the originating side of the SPVP.
Destination PORT	The port identifier on the terminating switch fabric that contains the permanent portion for this SPVP, if the destination end is a FORE switch. If the port at the destination switch cannot be determined, a question mark (?) is displayed.
Destination VPI	The virtual path number on the destination switch fabric that contains the permanent portion for this SPVP. any means the user did not specify the VPI to be used at the destination.
Destination UPC	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index associated with this SPVP.
Destination VPVC-SEL	NoPref means that you did not specify which VPI that the destination switch should use for the permanent portion of the through path when this SPVP was created. If the destination switch is a FORE switch, the value is displayed in the Destination VPI field. If the destination switch is not a FORE switch, a ? is displayed in the Destination VPI field. Require means that the destination switch must use the VPI given when the SPVP was created for the permanent portion of the through path.
PRIORITY	The order in which this SPVP is tried for a connection. Values are from 1 to lowestpriority, with 1 being the highest priority (the first tried and the most often tried) and with lowestpriority being the value configured under conf spvx spvpc parameters priority lowestpriority. This option only applies to the source switch.
STATE	The state of this SPVP. Can be up or down.
Destination	The NSAP ATM address for the terminating side of the SPVP.

12.2.8.2 Displaying Advanced SPVP Information

To display advanced information about SPVPs on this switch, enter the following:

```
myswitch::configuration spvx spvpc> show advanced
 Originating PNNI SPVPCs:
        Source
                           Destination
  INDEX PORT VPI UPC PORT VPI UPC VPVC-SEL PRIORITY STATE
  402 1C1 40 0 18 38 0 require 1
        Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
  ForwardQos = class0, BackwardQos = class0, Clip = no
  DTL info:
         DtlTag = 1000
         Backoff = disabled, AutoDtl = disabled
         DTL in use: proto = pnni, nodeIndex = 1 dtlIndex = 100
  Advanced info:
         Name = N/A, Cost = 5040, Reroute = disabled
         Domainid = 1, QoSExpIndex = 0
         Uptime = 0 \text{ days } 05:46
 Terminating PNNI SPVPCs:
        Source
                      Destination
  INDEX PORT VPI PORT VPI STATE
        2 18 1B4 12 up
        Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
  ForwardQos = class0, BackwardQos = class0, Clip = no
  Uptime = 0 days 05:46
 Originating PNNI SPVPCs:
                          Destination
        Source
  INDEX PORT VPI UPC PORT VPI UPC VPVC-SEL PRIORITY STATE
  400
       1C4 38 0 16 28 0 require 1
        Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d00a5.00
  ForwardQos = class0, BackwardQos = class0, Clip = no
  DTL info:
         DtlTag = 1000
         Backoff = disabled, AutoDtl = disabled
  Advanced info:
         Name = N/A, Cost = 5040, Reroute = disabled
         Domainid = 1, QoSExpIndex = 0
         Last Failure Cause = resource-unavailable-or-unspecified-Cause47
Last Failure Location = LCL:1 LINK:65533 VPI:65533 NSAP:47000580ffe1000000f21a4827
         Downtime = 0 days 05:46, Retry Count = 25
```

The basic information fields in this display are defined as listed previously for conf spvx spvpc show. The advanced and DTL information fields in this display are defined as follows:

Field	Description
ForwardQos	The requested quality of service for this SPVP in the forward (calling to called) direction.
BackwardQos	The requested quality of service for this SPVP in the backward (called to calling) direction.
Clip	no means this SPVP is not susceptible to clipping and yes means it is susceptible to clipping.
DtlTag	The Designated Transit List (DTL) tag, or index number, assigned to this SPVP which corresponds to a DTL table that you configure under conf atmr dtltable. The DTL specifies the preferred call routing for the SVC portion of the SPVP.
Backoff	enabled means the back-off mechanism is used for this SPVP. Upon a failure, directed DTLs that are configured for this SPVP are not retried until the amount of time specified under conf spvx spvpc pnni parameters backoff interval has elapsed. This allows old information to age out. disabled means the back-off mechanism is not used for this SPVP and directed DTLs that are configured for this SPVP are retried continually upon a failure.
AutoDtl	enabled means that dynamic path computation is used to route an SPVP when all of the configured DTLs fail or when no DTLs are configured. disabled means that dynamic path computation is not used to route an SPVP when all of the configured DTLs fail or when no DTLs are configured. This feature applies to both FT-PNNI and PNNI DTLs.
proto	Shows which protocol this DTL is using. For SPVPs, can only be pnni.
nodeIndex	The index number of the PNNI node on which the DTLs are being used. This field is not displayed when the protocol is FT-PNNI.
dtlIndex	The index number of the DTL.
Name	The optional name assigned to this SPVP to help identify it. If no name is assigned, ${\tt N/A}$ is displayed.
Cost	The current call routing cost for this originating SPVP. If the SPVP is down, shows ${\tt N/A}$.
Reroute	enabled means this SPVP is examined to see if it is using a sub-optimal route. If it is, it is rerouted according to the parameters in conf spvx spvpc parameters reroute. disabled means this SPVP is not examined to see if it is using a sub-optimal route.
Domainid	The PNNI domain ID number on the source (local) switch fabric.
QoSExpIndex	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVP call set-up message across a PNNI link. See the QoSExpIndex field under conf qos show for this number.
Last Failure Cause	The reason for the last call setup failure for this SPVP. This field is only displayed for originating SPVPs that are down.
Last Failure Location	Upon a call setup failure for this PNNI SPVC, indicates the exact link, VPI, and NSAP address where the failure occurred.
Uptime	If applicable, shows, in hundredths of a second, the time since this SPVP was created or the time since the last successful call setup occurred. The STATE shows up.

Field	Description
Downtime	If applicable, shows, in hundredths of a second, the time that this SPVP has been down. The STATE shows down.
Retry Count	Displays the number of times the call setup has been attempted since the SPVP was created or since the last successful call setup occurred. This is only displayed when the STATE is down.

12.2.8.3 Displaying Summary SPVP Information

When the **summary** option is specified, only the first line of basic information is displayed for each SPVP. This option is useful for quickly finding out information such as which SPVPs are up and which are down, or the priority of the SPVPs. To display summary information about SPVPs on a switch, enter the following:

```
        myswitch::configuration
        spvp c> show summary

        Originating PNNI SPVPCs:

        Destination

        INDEX PORT VPI UPC PORT VPI UPC VPVC-SEL PRIORITY STATE

        1
        4B1
        10
        0
        179
        any
        0
        noPref
        10
        up

        2
        4B1
        11
        0
        179
        any
        0
        noPref
        10
        up

        Terminating PNNI SPVPCs:

        Source Destination

        INDEX PORT VPI PORT VPI STATE
        1
        0
        100
        4B1
        1
        up

        2
        0
        102
        4B1
        2
        up
```

You can also display summary information for just the originating or just the terminating SPVPs as follows:

```
myswitch::configuration spvx spvpc> show orig summary

Originating PNNI SPVPCs:

Source Destination

INDEX PORT VPI UPC PORT VPI UPC VPVC-SEL PRIORITY STATE

1   4B1   10   0   179   any   0   noPref   10   up

2   4B1   11   0   179   any   0   noPref   10   up

myswitch::configuration spvx spvpc> show term summary

Terminating PNNI SPVPCs:

Source Destination

INDEX PORT VPI PORT VPI STATE

1   0   100   4B1   1   up

2   0   102   4B1   2   up
```

You can also display summary information for an individual SPVP as follows:

The fields in all of these displays are defined as listed previously for conf spvx spvpc show. If no SPVPs have been configured, you receive the following message:

```
Originating PNNI SPVPCs:

No originating PNNI SPVPC information is available

Terminating PNNI SPVPCs:

No terminating PNNI SPVPC information is available
```

SPVX Configuration Commands

CHAPTER 13 Switch Configuration **Commands**

These commands allow you to configure settings for the switch. You can display the list of available subcommands by typing? at the switch level.

myswitch::configuration switch> ?

callrecord> performance> ntp> clockscale

ср fabric_id license name oam pmpmaxvci pmpminvci pools>

show timezone

13.1 **Configuring Call Records**

These commands let you configure call records that are used for billing purposes. You can display the list of available subcommands by typing? at the callrecord level.

myswitch::configuration switch callrecord> ? filter> memory> modify delete enable disable show password



NSAP-ping calls are not recorded on the source and destination switches. They are only recorded on transient switches.

13.1.1 Call Record Filters

These commands let you configure call record filters. You can display the list of available sub-commands by typing? at the filter level.

```
myswitch::configuration switch callrecord filter> ?
  add    modify    delete    show
```



Point-to-multipoint calls are always recorded as a series of legs. If you have a PMP PVC from A to B and from A to C, and a filter is applied to only record PVCs that involve port A, then both legs will be recorded. If the PMP PVC is from A to B and from B to C, then the same filter would not allow the B to C leg to be recorded.

13.1.1.1 Adding Call Record Filters

This command lets you add call record filters. Call record filters allow you to record or ignore certain types of calls (PVPs, PVCs, SVPs, SVCs, SPVPs, SPVCs, or failed calls). Once a filter is configured, it will only be applied to calls which are created after the filter was added or modified. Enter the following parameters:

```
myswitch::configuration switch callrecord filter> add new [port [<vpi> [<vci>]]]
<record | ignore> [-callType (one or more of: [PVP, PVC, SVP, SVC, SPVP, SPVC,
FailedCall])]
```



See Section 13.1.1.2 for parameter descriptions.

For example, if you want to apply a filter that records PVPs and PVCs at port 1A2 with VPI 0 and VCI 22, you would enter the following:

myswitch::configuration switch callrecord filter> add new 1A2 0 22 record -callType PVP

More specific filters override more general filters. For example, if you have configured several filters for PVCs:

```
myswitch::configuration switch callrecord filter> show
Port Vpi Vci PVC PVP SVC SVP SPVP SPVC
Any Any Any
                 N
                    N
3A1 Any Any
             Y N N N
                           N
3A1
      0 Any
             N N N N
                           N
                               Ν
3A1
      0 37 Y N N N
                           N
                               Ν
```

this would mean PVC with specific port 3A1, VPI=0, VCI=37 is recorded, PVC port 3A1, VPI=0, VCI=38 is not recorded, PVC port 3A1, VPI=3, VCI=51 is recorded, and PVC port 3A1, VPI=0, VCI=37 is not recorded.

13.1.1.2 Modifying Call Record Filters

This command lets you modify existing call record filters. Once a filter is configured, it will only be applied to calls which are created after the filter was added or modified. Enter the following parameters:

```
myswitch::configuration switch callrecord filter> modify [port [<vpi> [<vci>]]]
<record | ignore> [-callType (one or more of: [PVP, PVC, SVP, SVC, SPVP, SPVC,
FailedCall])]
```

The parameters for add and modify are defined as follows:

Parameter	Description
port	The port to which the call record filter is applied or modified. If a port is not specified, the filter applies to all ports on the switch.
vpi	The VPI of the port to which the call record filter is applied or modified. If a VPI is not specified, the filter applies to all paths at the specified port.
vci	The VCI to which the call record filter is applied or modified. It not specified, the filter applies to all channels at the specified port.
record	Record calls based on the specified call type. Specifying record for specific call types will imply that the unspecified call types will be ignored.
ignore	Ignore calls based on the specified call type. These calls will not be recorded.
callType	Type of call to be recorded or not recorded. One or more types can be entered.

13.1.1.3 Deleting Call Record Filters

This command lets you delete call record filters for a specific port, VPI, and VCI, or for the entire switch fabric. Enter the following parameters:

```
myswitch::configuration switch callrecord filter> delete [port [<vpi> [<vci>]]]
```

These parameters are defined as follows:

Parameter	Description
port	Delete filters on a specific port. If a port is not specified, the filter created for all ports on the switch will be deleted.
vpi	Delete filters for calls with a specific VPI on the port. If not specified, filters are deleted from the specified port.
vci	Delete filters for calls on a specific port with a specific VPI and VCI. It not specified, filters are deleted on all channels with a specific port and VPI.

13.1.1.4 Displaying Call Record Filters

This command lets you display call record filters. Enter the following:

```
myswitch::configuration switch callrecord filter> show

Port Vpi Vci PVC PVP SVC SVP SPVP SPVC

Any Any Any Y Y Y Y Y Y

3A1 Any Any N Y N Y N N N

3A2 0 Any N N N N N N
```

The fields are defined as follows:

Field	Description
Port	Port to which a filter has been applied. Any means a filter has been applied to all ports on the switch.
Vpi	VPI to which a filter has been applied. Any means a filter has been applied to all VPIs on the specified port.
Vci	VCI to which a filter has been applied. Any means a filter has been applied to all VCIs on the specified port and VPI.
PVC, PVP, SVC, SVP, SPVP, SPVC	${\tt Y}$ means this call type will be recorded for calls that match this filter. ${\tt N}$ means this call type will not be recorded for calls that match this filter.

If call record filters have not been configured, the following will be displayed:

```
myswitch::configuration switch callrecord filter> show
No Filter Information is available
```

13.1.2 Configuring Call Record Memory

These commands let you configure call record memory. Type ? at the memory level to display the list of available subcommands.

```
myswitch::configuration switch callrecord memory> ?
modify reset show
```

13.1.2.1 Modifying Memory Pool Configuration

This command lets you modify the call record memory pool. Enter the following parameters:

```
myswitch::configuration switch callrecord memory> modify
-poolRecordSize <Number of Records to be stored in Pool Memory>
[-maxPoolRecordSize <Max Number of Records to be stored in Pool Memory>]
-poolDTBSize <Number of Data Transfer Buffers to be stored in Pool Memory>
[-maxPoolDTBSize <Max Number of Data Transfer Buffers to be stored in Pool Memory>]
[-memoryFailureOption <dontRecordCall | rejectCall>]
```

The parameters are defined as follows:

Parameter	Description
-poolRecordSize	Minimum number of records which will be stored in the memory pool. The default is 100. Entering a value of 0 resets the value to the default. Values entered (with the exception of 0) are internally rounded to the next multiple of 64. Entering a value between 1 and 64 would be rounded to 64. Entering a value between 65 and 128 would be rounded to 128 and so on.
-maxPoolRecordSize	Maximum number of records that can be saved in the memory pool. The default is 0 meaning there is no maximum limit. Values entered (with the exception of 0) are internally rounded to the next multiple of 64. Entering a value between 1 and 64 would be rounded to 64. Entering a value between 65 and 128 would be rounded to 128 and so on.
-poolDTBSize	Minimum number of data transfer buffers to be configured in the memory pool. The default is 20. Entering a value of 0 resets the value to the default. Values entered (with the exception of 0) are internally rounded to the next multiple of 2.

Parameter	Description
-maxPoolDTBSize	Maximum number of data transfer buffers that can be configured in the memory pool. The default is 0 meaning there is no maximum limit. Values entered (with the exception of 0) are internally rounded to the next multiple of 2.
-memoryFailureOption	The action that the switch fabric should take if the memory allocated for call records runs out. dontRecordCall means that the call should be allowed, but no call record should be generated for that call. rejectCall means that the call should be rejected. If this parameter is changed, it takes effect immediately. The default is rejectCall.

CAUTION



By default, call recording has a minimum memory configuration for the number of records that can be stored in memory (100), but no maximum on the number of records or data transfer buffers. Depending on the call setup traffic, call recording may use up the entire switch memory. Ensure that the maximum number of records that can be saved or the maximum number of data transfer buffers are configured.

13.1.2.2 Resetting Call Record Memory Configuration

This command lets you reset call record memory configuration to the default values.

myswitch::configuration switch callrecord memory> reset

13.1.2.3 Displaying Call Record Memory Configuration

This command lets you display current call record memory configuration.

```
myswitch::configuration switch callrecord memory> show

Configured Records in Memory Pool = 100

Maximum Records in Memory Pool = 0

Operational Records in Memory Pool = 3

Configured DTBs in Memory Pool = 20

Maximum DTBs in Memory Pool = 0

Operational DTBs in Memory Pool = 0

Memory Failure Option = rejectCall
```

The fields are defined as follows:

Field	Description
Configured Records in Memory Pool	Minimum number of records configured in the memory pool.
Maximum Records in Memory Pool	Maximum number of records configured in the memory pool. 0 means there is no maximum limit. $ \\$
Operational Records in Memory Pool	Current number of records in the memory pool. Not Applicable means callrecording is off.
Configured DTBs in Memory Pool	Minimum number of data transfers buffers (DTBs) configured in the memory pool.
Maximum DTBs in Memory Pool	Maximum number of data transfer buffers (DTBs) allowed in the memory pool.
Operational DTBs in Memory Pool	Current data transfer buffers in the memory pool. Not Applicable means callrecording is off.
Memory Failure Option	The action that the switch fabric is configured to take if the memory allocated for call records runs out. rejectCall means that the call will be rejected. noRecord means that the call will be allowed, but no call record will be generated for that call. If this value is changed, it takes effect immediately.

13.1.3 Configuring Call Record File Transfer Variables

This command lets you configure new call record file transfer variables. Enter the following parameters:



See Section 13.1.4 for parameter descriptions.

The following is an example of how to set up the variables for a call record transfer:

myswitch::configuration switch callrecord> new -primary //169.124.49.90/us/crcrfile -primary_userid jsmith -secondary //169.124.20.90/us/crcrfile -secondary_userid msmith -interval 1



The secondary data server is not required. However, if the secondary data server is not specified, then failover will not take place. The primary data server will be considered as the secondary data server.

13.1.4 Modifying Call Record Variables

This command lets you modify the call record transfer variables. Enter the following:

The following is an example of how to modify the variables for a call record transfer:

```
myswitch::configuration switch callrecord> modify -primary //169.124.49.90/us/
crcrfile -primary_userid jsmith
```

The parameters for new and modify are defined as follows:

Parameter	Description
primary-URL	The primary URL for call record transfers in the form:
	// <ip-address>[:port][<pathname>[<filename>]]</filename></pathname></ip-address>
	<pre><ip-address> is the IP address of the host to contact. [:port] is the port number on the host to contact. <pathname> is the directory on the host into which the call record files should be saved. <filename> is the filename on the host into which the call record files should be saved. Call records appends the switch type, date, time, etc. at the end of the filename. For example: crfile becomes crfileASX-200BX_account.199901131353. 01.19171.0.cc</filename></pathname></ip-address></pre> If call recording is on and this URL has changed, the change takes effect at the next recording interval.
primary_userid	The userid to be used for the data transfer sessions to the primary data server. If call recording is on and this URL is changed, the change takes effect at the next recording interval.

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Parameter	Description
secondary-URL	The URL to be used in the event that the transfer to the primary URL is not successful. If the file transfer attempt to this URL fails as well, the switch generates a trap.
	// <ip-address>[:port][<pathname>[<filename>]]</filename></pathname></ip-address>
	<pre><ip-address> is the IP address of the host to contact.</ip-address></pre>
	[:port] is the port number on the host to contact.
	[<pre>[<pathname>] is the directory on the host into which the call record files should be saved. [<filename>] is the filename on the host into which the call record files should be saved.</filename></pathname></pre>
	If call recording is on and this URL has changed, the change takes effect at the next recording interval. Call records appends the switch type, date, time, etc. at the end of the filename. For example: crfile becomes crfileASX-200BX_account.199901131353.01.19171.0.cc
	Configuring a secondary data server is not required. However, if the secondary data server is not specified, then failover will not take place.
secondary_userid	The userid to be used for the data transfer sessions to the secondary data server. If call recording is on and this URL is changed, the change takes effect at the next recording interval.
	are each strings of characters which may consist of special tokens. These tokens allow you to ation you want on the call data record. One or more of the following tokens can be entered in
%T	The type of switch.
%N	The "SerialNumber" for an ASX-200BX or TNX-210, or the "EnclosureNumber.Serial-Number" for an ASX-1000, ASX-1200, ASX-4000, or TNX-1100.
%I	The switch's IP address (e.g., 169.144.1.90).
%D	The date and time formatted as follows: YYYYMMDDhhmm.
%R	The interval between recordings, in minutes.
%C	The contents of the call record file; account is for call record data.

Parameter	Description
%F	The status of the file; co is for the file to which the switch fabric is currently writing, cc is for the file to which the switch fabric has completed writing. If the pathname is not specified, the default file is transferred to the login directory specified in <userid>. The following string is used as the default filename in the case where the URL ends with a "/" (i.e., without any filename): %T_%C.%D.%R.%N.%F. If multiple switches are to write to the same location, the pathname or filename should contain either a %I or a %N token. A %D token in the filename portion separates each recording interval worth of data into a different file with the name being the time that the file was created. The following example would record every switch type and switch IP into a separate directory with a file at each recording interval: //169.144.1.5/usr/auditlog/%T/%I/%D Given an ASX-200BX switch with an IP address of 169.44.4.4, this would produce files in the following directory tree structure:</userid>
	/usr/auditlog/ASX200BX/169.44.4.4/9608252355
	If the filename specified is not made up of the above tokens, then it is used as a prefix to the default filename. If the file transfer attempt fails, the switch generates a trap and attempts a transfer to the secondary-URL. If the Admin status is secondary-URL and this URL is changed, the change takes effect at the next recording interval.
recording-interval-in-min- utes	The interval (in minutes) at which the data is transferred to the host. If the Admin status is on and this value is changed, the change takes effect at the next recording interval. Valid values are integers greater than or equal to 1. The default is 5 minutes.

vitch Configuratio

13.1.5 Setting the Data Server Password

This command allows you to change the data server password for call records.

myswitch::configuration switch callrecord> password (primary | secondary)

The parameters are defined as follows:

Parameter	Description
primary	The password is being set for the primary data server.
secondary	The password is being set for the secondary data server.



If the admin status is on and the password is changed, the change takes effect at the next recording interval.

```
myswitch::configuration switch callrecord> password primary
Enter password:
Retype new password:
```

For security reasons, the switch does not echo your password, but asks you to confirm the password by retyping it.

13.1.6 Enabling Call Record Transfers

This command lets you enable (turn on) call recording for the switch fabric. The password must be set using configuration switch callrecord password before you can enable call recording transfers.

myswitch::configuration switch callrecord> enable

If call records have not been configured, the following displays:

myswitch::configuration switch callrecord> enable Callrecords has not been configured.



Ensure that the switch time and date are set correctly using oper date before enabling the call recording feature. Otherwise, your call records will not be accurate.

13.1.7 Deleting Call Record Configuration

This command allows you to disable and delete call record configuration. Entering this command prompts you with a message before executing the command. The switch asks if you really want to disable and delete call record configuration. This gives you a chance to abort the command if necessary.

```
myswitch::configuration switch callrecord> delete Are you sure you want to disable and delete Callrecords configuration [n]? y Callrecords configuration deleted.
```

13.1.8 Disabling Call Record Transfers

This command allows you to disable (turn off) call recording transfers for the switch fabric. All memory configured via the memory submenu will be released to the system. However, the memory configuration will not be changed.

```
myswitch::configuration switch callrecord> disable
Are you sure you want to disable Callrecords [n]? y
Callrecords disabled
```

If call records have not been configured, the following displays:

```
myswitch::configuration switch callrecord> disable Call Recording not enabled.
```



Disabling call records means this information is not recorded or transferred, but the configuration information for the transfer variables (i.e. primary URL, secondary URL, recording interval) is still present.

Switch Configuratio

13.1.9 Showing Call Record Information

This command allows you to display call record information for the entire switch fabric.

myswitch::configuration switch callrecord> show Admin status Operational status = on Primary URL = //169.124.49.90/us/cr/crfile/ Secondary URL = //169.124.20.90/us/cr/crfile/ Recording interval Primary userid = jsmith Secondary userid = jsmith Failed primary data transfers = 10 Failed secondary data transfers = 0 File transfer status = secondarySucceeded File transfer error message = No errors found Primary trap status = crXfrOtherError Secondary trap status = crXfrNoError

The fields in these displays are defined as follows:

Field	Description
Admin status	Shows if call recording is administratively enabled (on) or disabled (off). The default is off.
Operational status	The operational status of call recording. The status can be on, off, or shutting down.
Primary URL	The primary URL for call record file transfers.
Secondary URL	The URL is to be used in the event that the transfer to the primary URL is not successful.
Recording interval	The interval at which the relevant information is transferred to the host. The default is 5 minutes.
Primary userid	The primary userid to be used for the data transfer sessions to the primary data server.
Secondary userid	The secondary userid to be used for the data transfer sessions to the secondary data server.
Failed primary data trans- fers	The number of failed data transfers to the primary data server.
Failed secondary data trans- fers	The number of failed data transfers to the secondary data server.
File transfer status	One of the following messages describing the status of the current file transfer: primaryInProgress, secondaryInProgress, primarySucceeded, secondarySucceeded, bothFailed. If the data transfer is not successful, refer to the message in the Primary trap status or Secondary trap status field.

Switch Configuration Commands

Field	Description
File transfer error message	A text message describing the status of the last failed file transfer. An error message displays only if the file transfer status displays bothFailed.
Primary trap status	The trap status of the file transfer to the primary URL. The trap status is <code>crXfrNoError</code> at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the following error conditions: <code>crXfrOtherError</code> , <code>crXfrDiskFullorAllocationExceeded</code> , <code>crXfrAccessViolation</code> , <code>crXfrNoResponseFromServer</code> .
Secondary trap status	The trap status of the file transfer to the secondary URL. The trap status is <code>crxfrnoerror</code> at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the error conditions listed above.

If call records have not been configured, you receive the following message:

myswitch::configuration switch callrecord> **show** Callrecords not configured.



Post-processing of call data records is available through $ForeView^{\circledast}$ $Accountant^{\intercal}$. This application can be used to convert call record data from binary to ASCII format so that the information can be imported into databases or spreadsheet programs. For more information, please refer to the ForeView Accountant User's Manual.

Switch Configuration

13.2 Configuring Performance Monitoring Records

These commands let you configure performance monitoring for system performance. You can display the list of available subcommands by typing? at the performance level.

13.2.1 Creating Performance Monitoring Variables

This command lets you configure new performance monitoring transfer variables. Enter the following parameters:

```
myswitch::configuration switch performance> new
   -primary <primary-URL> -primary_userid <userid>
   [-secondary <secondary-URL> -secondary_userid <userid>]
   [-interval <recording-interval-in-minutes>]

Note: <primary-URL> and <secondary-URL> are of the form
//<ip-address>[:port][<pathname>[<filename>]]
```

The following is an example of how to set up the variables for a performance monitoring transfer to the data server:

myswitch::configuration switch performance> new -primary //169.124.49.90/us/joe/info/cr/switcha/ -primary_userid joe -secondary //169.124.0.90/us/joe/info/cr/switcha/ -secondary_userid moe -interval 1



The secondary data server is not required. However, if the secondary data server is not specified, then failover can not take place.



See Section 13.2.2 for parameter descriptions.

13.2.2 Modifying Performance Monitoring Variables

This command lets you modify the performance monitoring transfer variables. Enter the following parameters:

The following is an example of how to modify the variables for a performance monitoring transfer:

```
myswitch::configuration switch callrecord> modify -primary //169.124.49.90/us/joe/info/cr/switcha/ -primary_userid joe -secondary //169.124.0.90/us/joe/info/cr/switcha/ -secondary_userid moe -interval 1
```



The secondary data server is not required. However, if the secondary data server is not specified, then failover can not take place.

These parameters for new and modify are defined as follows:

Parameter	Description
primary-URL	The primary URL for performance monitoring data record transfers in the form:
	// <ip-address>[:port][<pathname>[<filename>]]</filename></pathname></ip-address>
	<pre><ip-address> is the IP address of the host to contact.</ip-address></pre>
	[:port] is the port number on the host to contact.
	<pre><pathname> is the directory on the host into which the performance data files should be</pathname></pre>
	saved.
	<pre><filename> is the filename on the host into which the performance data files should be saved.</filename></pre>
	If performance monitoring is on and this URL has changed, the change takes effect at the next recording interval.
primary_userid	The userid to be used for the data transfer sessions to the primary data server. If performance monitoring is on and this URL is changed, the change takes effect at the next recording interval.

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Parameter	Description
secondary-URL	The URL to be used in the event that the transfer to the primary URL is not successful. If the file transfer attempt to this URL fails as well, the switch generates a trap.
	// <ip-address>[:port][<pathname>[<filename>]]</filename></pathname></ip-address>
	<pre><ip-address> is the IP address of the host to contact. [:port] is the port number on the host to contact.</ip-address></pre>
	[<pre>pathname>] is the directory on the host into which the performance monitoring files should be saved.</pre>
	[<filename>] is the filename on the host into which the performance monitoring files should be saved.</filename>
	If performance monitoring is on and this URL has changed, the change takes effect at the next recording interval.
	Configuring a secondary data server is not required. However, if the secondary data server is not specified, then failover will not take place.
secondary_userid	The userid to be used for the data transfer sessions to the secondary data server. If performance monitoring is on and this URL is changed, the change takes effect at the next recording interval.
	are each strings of characters consisting of the special tokens. These tokens allow you to information you want on the performance data record. One or more of the following tokens
%T	The type of switch.
%N	The "SerialNumber" for an ASX-200BX or TNX-210, or the "EnclosureNumber.Serial-Number" for an ASX-1000, ASX-1200, ASX-4000, or TNX-1100.
%I	The switch's IP address (e.g., 169.144.1.90).
%D	The date and time formatted as follows: YYYYMMDDhhmm.
%R	The interval between recordings, in minutes.
%C	The contents of the performance data file; stats is for performance monitoring data.

Parameter	Description
%F	The status of the file; co is for the file to which the switch fabric is currently writing, cc is for the file to which the switch fabric has completed writing. If the pathname is not specified, the default file is transferred to the login directory specified in <userid>. The following string is used as the default filename in the case where the URL ends with a "/" (i.e., without any filename): %T_%C.%D.%R.%N.%F If multiple switches are to write to the same location, the pathname or filename should contain either a %I or a %N token. A %D token in the filename portion separates each recording interval worth of data into a different file with the name being the time that the file was created. The following example would record every switch type and switch IP into a separate directory with a file at each recording interval: //169.144.1.5/usr/auditlog/%T/%I/%D Given an ASX-200BX switch with an IP address of 169.44.4.4, this would produce files in</userid>
	the following directory tree structure:
	/usr/auditlog/ASX200BX/169.44.4.4/9608252355
	If the filename specified is not made up of the above tokens, then it is used as a prefix to the default filename. If the file transfer attempt fails, the switch generates a trap and attempts a transfer to the secondary-URL. If the Admin status is secondary-URL and this URL is changed, the change takes effect at the next recording interval.
recording-interval-in-min- utes	The interval (in minutes) at which the data is transferred to the host. If the Admin status is on and this value is changed, the change takes effect at the next recording interval. Valid values are integers greater than or equal to 1. The default is 5 minutes.

Switch Configuration

13.2.3 Setting the Data Server Password

This command allows you to change the data server password for performance monitoring.

myswitch::configuration switch performance> password (primary|secondary)

The parameters are defined as follows:

Parameter	Description
primary	The password is being set for the primary sever.
secondary	The password is being set for the secondary server.



If the admin status is on and the password is changed, the change takes effect at the next recording interval.

myswitch::configuration switch performance> password primary
Enter password:
Retype new password:

For security reasons, the switch does not echo your password, but asks you to confirm the password by retyping it.

13.2.4 Enabling Performance Monitoring Transfers

This command lets you enable (turn on) performance monitoring transfers for the switch fabric. The password must be set using conf switch performance password before you can enable performance monitoring transfers.

myswitch::configuration switch performance> enable



Ensure that the switch time and date are set correctly using oper date before enabling the performance monitoring feature. Otherwise, your performance monitoring records will not be accurate.

13.2.5 Disabling Performance Monitoring Transfers

This command allows you to disable (turn off) performance monitoring transfers for the switch fabric. The switch asks if you really want to disable performance monitoring. Entering **n** or pressing **<enter**> aborts the command. Entering **y** disables performance monitoring.

myswitch::configuration switch performance> **disable**Are you sure you want to disable Performance Monitoring [n]? **y**Performance Monitoring disabled



Disabling performance monitoring means this information is not recorded or transferred, but he configuration information for the transfer variables (i.e. primary URL, secondary URL, recording interval) is still present.

13.2.6 Deleting Performance Monitoring Variables

This command allows you to delete performance monitoring transfer variables. Entering this command prompts you with a message before executing the command. The switch asks if you really want to delete performance monitoring configuration. Entering \mathbf{n} or pressing \mathbf{enter} aborts the command. Entering \mathbf{y} deletes the performance monitoring configuration.

myswitch::configuration switch performance> **delete**Are you sure you want to disable and delete Performance Monitoring configuration [n]? **y**Performance Monitoring configuration deleted.

witch Configuratio

13.2.7 Displaying Performance Monitoring Information

This command allows you to display performance monitoring information for the entire switch fabric.

```
myswitch::configuration switch performance> show
  Admin status
  Primary URL
                                   = //169.124.29.9/home/jsmith/perf/4000p/
  Secondary URL
                                  = //169.124.29.9/home/jsmith/perf/4000s/
  Recording interval
  Primary userid
                                  = jsmith
  Secondary userid
                                  = jsmith
  Failed primary data transfers
                                 = 0
  Failed secondary data transfers = 0
  File transfer status
                                 = 0
  File transfer error message
  Primary trap status
                                  = crXfrNoError
  Secondary trap status
                                 = crXfrNoError
```

Field	Description
Admin status	Shows if performance monitoring is enabled (on) or disabled (off). The default is off.
Primary URL	The primary URL for performance monitoring record file transfers.
Secondary URL	The URL is to be used in the event that the transfer to the primary URL is not successful.
Recording interval	The interval at which the relevant information is transferred to the host. The default is 5 minutes.
Primary userid	The primary userid to be used for the data transfer sessions to the primary data server.
Secondary userid	The secondary userid to be used for the data transfer sessions to the secondary data server.
Failed primary data transfers	The number of failed data transfers to the primary data server.
Failed secondary data transfers	The number of failed data transfers to the secondary data server.
File transfer status	One of the following messages describing the status of the current file transfer: primaryInProgress, secondaryInProgress, primarySucceeded, secondarySucceeded, bothFailed. If the data transfer is not successful, refer to the message in the Primary trap status or Secondary trap status field.
File transfer error message	A text message describing the status of the last failed file transfer.

Switch Configuration Commands

Field	Description
Primary trap status	The trap status of the file transfer to the primary URL. The trap status is <code>crxfrNoError</code> at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the following error conditions: <code>crxfrOtherError</code> , <code>crxfrDiskFullorAllocationExceeded</code> , <code>crxfrAccessViolation</code> , <code>crxfrNoResponseFromServer</code> .
Secondary trap status	The trap status of the file transfer to the secondary URL. The trap status is <code>crxfrNoError</code> at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the error conditions listed above.

If performance monitoring has not been configured, you receive the following message:

myswitch::configuration switch performance> show
Performance monitoring not configured.



Post-processing of call data records is available through $Fore View^{\textcircled{@}} Accountant^{\nearrow}$. This application can be used to convert performance record data from binary to ASCII format so that the information can be imported into databases or spreadsheet programs. For more information, please refer to the $Fore View \ Accountant \ User's \ Manual$.

13.3 Configuring the Clock Scaling Factor

This is an advanced command that lets you set the clock scaling factor for traffic policing on a switch board (fabric). The switch board represents units of time (i.e., burst tolerances) in internal units of clock ticks. Because of the 40 MHz clock used on the switch fabric, the maximum unit of time that can be used by the traffic policing hardware is 0.838 seconds. However, the burst tolerance of some VBR connections is larger than 0.838 seconds, so they can not be correctly policed by the switch. To accommodate these cases, it is possible to scale the clock to represent larger amounts of time with the same number of ticks.

```
myswitch::configuration switch> clockscale <factor>
```

These parameters are defined as follows:

Parameter	Description
factor ¹	The factor by which you want to scale the clock. The scaling factor multiplied by 0.838 seconds should be greater than the burst tolerance of the connection. The default is 1.

^{1.} This command is only useful when performing traffic policing on VBR traffic with an extremely large burst tolerance that is destined for a very low speed (DS1) link. If these conditions are not represented in your network, it is recommended that you leave this value at the default setting.

If you change the clockscale setting, the following warning is displayed:

```
myswitch::configuration board> clockscale 2
   ***** WARNING *****
Changing the Clock Scale Factor will have undesired effects on
existing policed connections until the switch software is restarted.
Restart the switch software [n]?
```

Entering \mathbf{n} or pressing <**ENTER**> aborts the command. Entering \mathbf{y} causes the switch to restart and use the new clockscale setting.

Switch Configuration
Commands

13.4 Configuring PVC/PVP Connection Preservation

When connection preservation is enabled, all PVCs and PVPs that are listed in the CDB (and found to be intact in the hardware) are maintained without disruption of cell flow whenever an SCP fails over or is rebooted. Call recording for these connections continues without losing counts or generating a connection start/termination message. However, any PVCs or PVPs that are listed in the CDB and <u>not</u> found to be intact in the hardware are torn down. SPVCs and SPVPs are torn down and recreated. Call recording for connections that are torn down is terminated without a termination record.

When connection preservation is disabled, all connections are torn down and PVCs, PVPs, SPVCs, and SPVPs that are listed in the CDB are recreated. Call recording for these connections is terminated without a termination record.



Currently, connection preservation is not supported on the LE 155 and LE 25 switches, nor on *FramePlus* network modules.

Connection preservation should be enabled on *ASX*-200BXs and *TNX*-210s <u>only</u> if the switch is on an Uninterruptable Power Supply (UPS).

If you change the configuration of a network module using a command that normally requires a reset of the network module, but you do not reset it, the PVCs and PVPs are torn down and recreated the next time that the switch reboots or fails over.

When using an i960-based processor, connection preservation is not supported on port 1A1 because the boot PROM overwrites the data that corresponds to that port.

The generation of OAM cells is disrupted during an SCP failover or reboot, even if connection preservation is enabled.

This command lets you configure whether connection preservation for PVCs and PVPs is enabled or disabled on a switch.

myswitch::configuration switch> cp (enable | disable)

These parameters are defined as follows:

Parameter	Description
enable	enable means connection preservation will occur for all PVCs and PVPs in this switch. The default is enable for ESX-3000, ASX-4000, ASX-1000, ASX-1200, and TNX-1100 switches. The default is disable for ASX-200BX and TNX-210 switches.
disable	disable means connection preservation will not occur on this switch.

Connection preservation was first supported in ForeThought 5.3 . The EPD/PPD setting for all the VCC's on the fabric is off by default in FT5.3.x as it was not supported in that release. VCCs can be configured as: AAL5 or non AAL5. For more information about EPD/PPD, see Section 5.4 in Part 1 of this manual.

The following scenarios can occur regarding connection preservation and EPD/PPD when upgrading from 5.3.x to 6.0:

- In 5.3.x, if connection preservation is disabled and AAL5 is off = Connection is torn down.
- In 5.3.x, if connection preservation is disabled and AAL5 is on (This instance may occur if the switch was running 6.0 with AAL5, downgraded to 5.3.x, and then upgraded back to 6.0.) = Connection is torn down.
- In 5.3.x, if connection preservation is enabled and AAL5 off = Connection is preserved.
- In 5.3.x, if connection preservation is enabled and AAL5 on = Connection state is modified without tearing down the connection. In this case, if any cells are lost due to EPD/PPD, they will not be accounted for since the 5.3.x does not support EPD/PPD. You may want to disable connection preservation before performing a downgrade or leave connection preservation enabled, delete and recreate all VCs that have EPD/PPD enabled, one at a time.

13.5 Configuring the Switch Fabric ID

This command lets you change the fabric ID of the switch. The fabric ID is a unique, six-byte MAC address. Switch software uses the fabric ID as the MAC address of the switch Ethernet port, and as the End System Identifier (ESI) portion (bytes 14-19) of the switch NSAP address. Some bytes of the fabric ID are used in forming the SPANS address and PNNI and FT-PNNI domain prefixes. If you moved an SCP from one fabric to another, this six-byte fabric ID changed. Consequently, the SCP had a different MAC address, a different NSAP address, and a different domain prefix. If LANE or CLIP services were configured on the switch, some manual reconfiguration was required for all of the clients to learn the new server NSAP addresses. Any static routes also had to be reconfigured.

Instead, this command lets you configure the SCP with the fabric ID of the original switch fabric, thus overriding the default (factory-configured) fabric ID of the destination switch. This operation saves you from performing lots of manual reconfiguration to reflect the hardware change. The user-configured fabric ID is saved in the CDB and persists across reboots. This command can also be used to reset the user-configured fabric ID of a switch and have the SCP default back to the factory-configured fabric ID.

```
myswitch::configuration switch> fabric_id (<fabric ID> | reset)
```

These parameters are defined as follows:

Parameter	Description
fabric ID	The new six-byte MAC address for this switch. The address must be unique in your network.
reset	Entering reset indicates you want to delete the user-configured fabric ID from the CDB and go back to the factory-configured fabric ID for this switch fabric.

If you change the fabric ID, the switch verifies that you want to make the change:

```
myswitch::configuration switch> fabric_id 1020569c84bb

******** W A R N I N G ********

This operation sets the Fabric ID for this switch. Fabric ID must be a unique MAC address in your network. Changing the Fabric ID will change the MAC address, domain prefix and SPANS address of this switch. The switch software will be restarted. You will lose connectivity with the switch while this operation is progressing.

Are you sure you want to configure a new Fabric ID [n]? y

The switch will restart momentarily.
```

Switch Config

Entering n or pressing **<ENTER>** aborts the command. Entering y changes the fabric ID in the CDB and restarts the switch.

CAUTION



Since the fabric ID is used as the MAC address of the Ethernet port, the new fabric ID <u>must</u> be a unique, six-byte address in your entire network (and not just among the ATM switches). If you use an address that already exists, it can cause routing problems.

If you want to reset the fabric ID to the original factory-configured ID, the switch verifies that you want to make the change:

myswitch::configuration switch> fabric_id reset

******* W A R N I N G ******

This operation resets the user configured Fabric ID back to the original factory Fabric ID. Switch software will be restarted. You will lose connectivity with the switch while this operation is progressing.

Are you sure you want to reset the Fabric ID [n]? y

The switch will restart momentarily.

13.6 Configuring a Software License

This command lets you configure a software license on a switch. The software license you install on a switch entitles you to run a particular set of features. If you contact FORE's Technical Assistance Center (TAC) for support, you may be asked which license is running on the switch.

There are six types of licenses, four of which require a license key. The two default types of license which do not require a key are: Base and Legacy. The other license types which require a 12-character key are: Enterprise, Extended Enterprise, Traffic Engineering, and Gold. Only one of the six types of licenses may be configured on a switch. You must purchase a separate license for each switch. Enter the following parameter to configure a license:

myswitch::configuration switch> license <key>

This parameter is defined as follows:

Parameter	Description
key	The 12-character software license key for this switch. A key beginning with an ${\tt A}$ is an enterprise license, a ${\tt B}$ is an extended enterprise license, a ${\tt C}$ is a traffic engineering license, and a ${\tt D}$ is a gold license.

For example, if you purchased an extended enterprise license, you would enter something similar to the following:

myswitch::configuration switch> license B12345678901



Be sure to save your license key in a secure location. The key is preserved during an oper cdb reset operation. However, an oper cdb init operation restores the Base license, and you need to re-enter the key. To return to a Legacy license after a CDB initialization, you need to first downgrade to ForeThought 5.3.x and then perform the CDB initialization.



This command is only available to users with admin privileges. See Section 8.3.5 in Chapter 8 for more information about admin privileges.

13.7 Setting or Changing the Switch Name

This command enables you to set or change the name of the switch. The switch name is shown on the front panel display LED.

myswitch::configuration switch> name <name>

This parameter is defined as follows:

Parameter	Description
name	The new name for the switch. If no name has been set using this command, then ${\tt ATM}$ ${\tt SWITCH}$ is displayed on the front panel of the switch and as the prompt name.

When the switch name is changed using this command, the new switch name is stored in the CDB and persists across reboots. Also, the prompt name changes immediately¹ to match new switch name, as long as the prompt name has not been changed explicitly using the <new-prompt> option under conf system prompt. For example:

myswitch::configuration switch> name fishtank
fishtank::configuration switch>

^{1.} If the switch name is changed using SNMP, you must log out and then log in again for the prompt name to change over to match the new switch name.

13.8 Network Time Protocol Commands

These commands let you configure Network Time Protocol (NTP) version 3 for the switch. NTP is a time synchronization protocol that allows clients and servers to be synchronized to a time standard.

Type? at the ntp level to display the list of available subcommands.

```
myswitch::configuration switch ntp> ?
server bclient peer> restrict>
status loop show
```



Only users who have admin privileges can use these commands to configure NTP. See Section 8.3.5 of Chapter 8 for more information about admin privileges.

13.8.1 Enabling/Disabling the NTP Server

This command lets you enable or disable the NTP server to activate or stop NTP service.

```
myswitch::configuration switch ntp> server [(enable | disable)]
```

The parameters are defined as follows:

Parameter	Description
enable	Enables the NTP service. Enabling the NTP server activates the NTP service.
disable	Disables the NTP service. Disabling the NTP server halts the NTP service. Memory used by the NTP server is cleared when the NTP service is disabled.

13.8.2 Configuring Broadcast Clients

This command lets you enable or disable the ability of the NTP service to receive and transmit NTP broadcasts.

```
myswitch::configuration switch ntp> bclient [(enable | disable)]
```

The parameters are defined as follows:

Parameter	Description
enable	Enables the NTP service to receive and transmit NTP broadcasts.
disable	Disables the NTP service from receiving and transmitting NTP broadcasts.

13.8.3 Managing the NTP Peer List

These commands let you manage the peer list. The peer list contains the NTP servers, peers, and broadcast addresses from which the NTP server will obtain the time values. These time values will determine the time synchronization. Type ? at the peer level to display the list of available subcommands.

```
myswitch::configuration switch ntp peer> ?
new     delete     show
```

13.8.3.1 Adding an NTP Peer

This command lets you add new servers, peers, and broadcast clients to the NTP peer list. Enter the following parameters:

```
myswitch::configuration switch ntp peer> new <ipaddr> (server |peer|broadcast)

[-version (1|2|3)] [prefer][-minpol1 <4-14>] {-maxpol1 <4-14>] {-ttl <1-127>]
```

Parameter	Description
ipaddr	IP address of the peer you want to add.
server peer broadcast	The entry type. server specifies that the local server is to operate in client mode with the specified remote server. peer specifies that the local server is to operate in symmetric active mode with the remote server. broadcast specifies that the local server sends periodic broadcast messages to a client population at the specified address.
version	Sets the NTP version of the listed server to be version 1, 2, or 3. If the version number is not set, the server will reply using the NTP version of the arriving request. The default is 3.
prefer	Marks the server as preferred. This means that if this server meets the specified synchronization source conditions, it will be chosen for synchronization over the other servers. The default is no preference (not specified).
minpoll	Controls the minimum range of the polling interval. The values are specified as a power of two with a minimum power of 4 and a maximum power of 14. The default is 6.
maxpoll	Controls the maximum range of the polling interval. The values are specified as a power of two with a minimum power of 4 and a maximum power of 14. The default is 10.
ttl	This option is used only with broadcast mode. Specifies the time-to-live to use on multicast packets. The default is 127.

13.8.3.2 Deleting an NTP Peer

This command lets you delete an NTP peer from the NTP peer list. Enter the following:

```
myswitch::configuration switch ntp peer> delete <ip address>
```

The parameter is defined as follows:

Parameter	Description
ipaddr	The IP address of the peer you want to delete from the peer list.

13.8.3.3 Displaying the NTP Peer List

This command displays the details of the peer list. The maximum number of entries in the table is 10.

```
myswitch::configuration switch ntp peer> show
NTP peer configuration
peer 192.144.3.14 prefer
peer 192.144.18.4
peer 192.144.2.27
peer 192.144.5.2 version 3 minpoll 5 maxpoll 10
```

13.8.4 Managing the NTP Restrict List

These commands let you manage the NTP restrict list. The restrict list contains a list of NTP peers with which the NTP server will interact. Type ? at the restrict level to display the list of available subcommands.

13.8.4.1 Creating Filters or Restrictions

This command lets you create filters or restrictions to limit which servers and clients will be used as a synchronization source by the NTP server. Enter the following parameters:

```
myswitch::configuration switch ntp restrict> new <ipaddr>
[-mask <ipmask>][ignore][noquery][nopeer][notrust]
```

The parameters are defined as follows:

Parameter	Description
ipaddr	The IP address of a host or a network. The default is 0.0.0.0.
ipmask	The IP mask of a host or a network. If the mask is omitted, the mask is defaulted to 255.255.255.255 meaning that the IP address should be treated as an individual host.
ignore	Ignore all packets from this host.
noquery	Ignore all NTP mode 6 and 7 packets (i.e. information queries and configuration requests) from this host.
nopeer	Provide stateless time service to polling hosts, but do not allocate peer memory resources to these hosts, even if they otherwise might be considered useful as future synchronization partners.
notrust	Treat these hosts normally in other respects, but never use them as synchronization sources.

13.8.4.2 Deleting an NTP Peer Filter

This command lets you delete a filter from the restrict table.

```
myswitch::configuration switch ntp restrict> delete <ipaddr>
```

The parameter is defined as follows:

Parameter	Description
ipaddr	The IP address to which a filter was applied.

13.8.4.3 Displaying the NTP Peer Filters

This command lets you display all peers to which a filter has been applied. The maximum number of entries is 10.

```
myswitch::configuration switch ntp restrict> show
NTP restrict configuration
restrict 0.0.0.0 nomodify notrust
restrict 192.144.0.0 mask 255.255.0.0 nomodify
```

13.8.5 Displaying NTP Peer Status

This command lets you display a summary of each peer's state.

myswitch::configuration switch ntp> status							
remote	local	st	poll	reach	delay	offset	disp
==========	=========	======	======	======	======		=====
^255.255.255.255	5.0.0.0	16	64	0	0.00000	0.000000	16.0000
+169.144.87.212	172.19.4.20	3	64	377	0.00963	0.240264	0.03209
+169.144.18.159	172.19.4.20	3	512	377	-0.0546	0.149196	0.05667
*169.144.2.19	172.19.4.20	2	64	377	-0.0006	0.247067	0.03146
+169.144.87.97	172.19.4.20	4	1024	377	0.00853	0.188766	0.13881
+169.144.1.27	172.19.4.20	3	64	377	-0.0055	0.239854	0.02582

Field	Description
remote ¹	Address of the remote peer.
local	Reference ID
st	Stratum of the remote peer.
poll	Polling interval, in seconds
reach	Reachability register, in octal. This is a shift register of NTP.WINDOW bits used to determine the reachability status of the peer, with bits entering from the least significant (rightmost) end. A peer is considered reachable if at least one bit in this register is set to one. The reachability register is shifted one position to the left, with zero replacing the vacated bit. If all bits of this register are zero, the clear procedure is called to purge the clock filter and reselect the synchronization source, if necessary. If the association was not configured by the initialization procedure, the association is demobilized.
delay	Current estimated delay, in seconds.
offset	Offset of the peer, in seconds
disp	Dispersion of the peer, in seconds.

^{1.} The characters to the left of the remote address indicate the relationship between the remote peer and the NTP server. + indicates symmetric active, - indicates symmetric passive, = means the remote server is being polled in client mode, ^ indicates that the server is broadcasting to this address, ~ indicates that the remote peer is sending broadcasts, and * indicates that the NTP server is currently synchronizing with this peer.

13.8.6 Displaying the Local Clock Loop Filter

This command lets you display the variables for the loop filter. The loop filter handles the adjustment of the local system clock. Enter the following:

myswitch::configuration switch ntp> loop

offset: 0.056268 s frequency: 22.854 ppm

poll adjust: -30 watchdog timer: 40 s

Field	Description
offset	The last time offset (in seconds) given to the loop filter by the packet processing code.
frequency	The frequency offset or frequency error (also called the clock drift) displays how fast or slow the local clock is running (in parts-per-million). The closer this value is to zero, the better. This value will also drift with the temperature changes that the switch experiences because temperature variations affect the ability of the local clock oscillator to maintain a constant frequency.
poll adjust	Controls how frequently hosts are polled (the range is from -30 to +30). For instance, if the poll adjust if -30 and the system poll period is greater than the <code>minpoll</code> value (<code>confswitch</code> ntp <code>peer</code> new) of the synchronization source host, then the system poll period is decreased by one power of two. When the poll period is +30 and the system poll period is less than the <code>maxpoll</code> value (<code>confswitch</code> ntp <code>peer</code> new) of the synchronization source host, then the system poll period is increased by one power of two. The system poll period does not change when the poll period is between the <code>minpoll</code> and <code>maxpoll</code> values.
watchdog timer	The number of seconds that have elapsed since the last sample offset was given to the loop filter. The system poll period controls when the next offset is given to the loopfilter.

13.8.7 Displaying NTP Server Status and Version

This command lets you display the NTP server build date and version number. It also displays the contents of the server and broadcast client variables, and the current status of the server. Enter the following:

```
myswitch::configuration switch ntp> show
NTP Version: xntpd 3-5.93 Fri May 22 16:46:40 EDT 1998 (1)
NTP server: enabled
NTP server status: server is running
NTP broadcast client: enabled
```

If the NTP service is disabled, something similar to the following displays:

```
myswitch::configuration switch ntp> show
NTP Version: xntpd 3-5.93 Fri May 22 16:46:40 EDT 1998 (1)
NTP server: disabled
NTP server status: server is shutdown
NTP broadcast client: disabled
```

Field	Description
NTP Version	The NTP server version and build date.
NTP server	The status of NTP service.
NTP server status	The status of the NTP server. The following can display in this field, depending on the server status: server is running means that the NTP server is active, server is shutdown means that the NTP server is not running, server is out of memory means that the NTP server exited because it could not get the requested memory, local clock time error is too large for ntp service (set clock manually) means that the server exited because the local clock and the network time is too far out of synchronization for NTP to function (Use oper date to set the switch time as close as possible to the network time then restart the NTP server)., server aborted means that the NTP server abnormally exited for reasons other than out of memory or clock synchronization problems, server shutdown is pending means that the server variable has been changed to disable and the NTP server is in the process of shutting down.
NTP broadcast client	The status of the NTP service to receive and transmit NTP broadcasts.

^{1.} If the NTP server exited for some unusual reason, it may be restarted by toggling the server variable from enable to disable and back again. When the NTP server exits, any switch resources dynamically allocated to NTP are returned to the switch.

13.9 Configuring OAM Cell Processing on a Switch

If you have enabled OAM cell processing on some ports on a switch fabric using the conf port aisrdi enable command, this command lets you override OAM cell transmission and reception on all ports on that switch fabric. (See Section 2.3 of this manual for more information about the conf port aisrdi command.) This command is useful if an errant node that is attached to one of the ports on your switch fabric is flooding your fabric with too many OAM cells.

When conf switch oam disable is entered, the port level settings are still retained, but OAM cell processing ceases on all ports on that fabric. When conf switch oam enable is entered, all ports on that fabric use their last port level settings again, so OAM cell processing starts again only on the ports on which it was last enabled.

```
myswitch::configuration switch> oam (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable disable	Entering enable returns all ports on this fabric to their last port level settings for OAM cell processing before this functionality was disabled. Entering disable causes OAM cell processing to stop on all ports on this fabric, despite the conf port aisrdi settings. These settings are still retained. The default is disable.

All switches respond to OAM end-to-end loopback requests for originating/terminating VPTs. All switches also pass through OAM end-to-end loopback requests and responses that are received for VPCs and VCCs transparently.

ASX-1000s, ASX-1200s, and TNX-1100s respond to all OAM segment loopback requests, while ASX-200BXs, ASX-200WGs, LE 155s, LE 25s, and TNX-210s only respond to OAM segment loopback requests received for originating/terminating VPTs. OAM segment loopback requests received for VPCs and VCCs are dropped by these types of switches. Also, the insertion of OAM loopback request cells is not supported.



This command does not override the OAM settings for *FramePlus* network modules that are configured using conf module fram oamf5.

13.10 Setting the Maximum Number of Reserved VCIs for PMPs

This command lets you change the upper end of the range of the block of VCIs that are reserved for point-to-multipoint (PMP) SVCs on all paths and all ports on this switch fabric. This range defaults to 155 - 555 on *ASX*-1200 switches and on *TNX*-1100 switches with SM-1100-B fabrics. On all other switch platforms, this range defaults to 155 - 255, which ensures that 101 PMP SVCs can always be created regardless of the number of point-to-point (PP) SVCs. PVCs can be created on these VCIs, but no PP SVCs may use these VCIs. PMP SVCs attempt to allocate a VCI outside this range only if all of the VCIs in the range have already been allocated.

You should change the default range only if the number of PMP SVCs that the switch must always be able to set up is greater than 101. Each LANE 1.0 ELAN requires two or three PMP SVCs, so if you are using more than 33 ELANs, you should increase the PMP reserved VCI range. However, since older versions of software only support up to 255 VCIs and since all output paths must support the entire range, it is better to lower the minimum reserved PMP VCI instead of increasing the maximum.



On an *ASX*-1200 or a *TNX*-1100 with SM-1100-B fabrics, if you are using a CDB from an SM-1000 or SM-1100 fabric that already has unicast PVCs configured across the backplane that overlap the additional multicast connections in the 256 - 555 range, you cannot use the additional multicast connections. You must delete the unicast PVCs and recreate them outside this range.

Enter the following:

myswitch::configuration switch> pmpmaxvci <vci>

This parameter is defined as follows:

Parameter	Description
vci	The top number for the range of VCIs to be reserved for PMP SVCs. The default is 555 on ASX -1200 switches and on TNX -1100 switches with SM-1100-B switch fabrics. The default is 255 on all other switch platforms.

13.11 Setting the Minimum Number of Reserved VCIs for PMPs

This command lets you change the lower end of the range of the block of VCIs that are reserved for point-to-multipoint (PMP) SVCs on all paths and all ports on this switch fabric. This range defaults to 155 - 555 on ASX-1200 switches and on TNX-1100 switches with SM-1100-B fabrics. On all other switch platforms, this range defaults to 155 - 255, which ensures that 101 PMP SVCs can always be created regardless of the number of point-to-point (PP) SVCs. PVCs can be created on these VCIs, but no PP SVCs may use these VCIs. PMP SVCs attempt to allocate a VCI outside this range only if all of the VCIs in the range have already been allocated.

You should change the default range only if the number of PMP SVCs that the switch must always be able to set up is greater than 101. Each LANE 1.0 ELAN requires two or three PMP SVCs, so if you are using more than 33 ELANs, you should increase the PMP reserved VCI range. However, since older versions of software only support up to 255 VCIs and since all output paths must support the entire range, it is better to lower the minimum reserved PMP VCI instead of increasing the maximum.



On an *ASX*-1200 or a *TNX*-1100 with SM-1100-B fabrics, if you are using a CDB from an SM-1000 or SM-1100 fabric that already has unicast PVCs configured across the backplane that overlap the additional multicast connections in the 256 - 555 range, you cannot use the additional multicast connections. You must delete the unicast PVCs and recreate them outside this range.

Enter the following:

myswitch::configuration switch> pmpminvci <vci>

This parameter is defined as follows:

Parameter	Description
vci	The bottom number for the range of VCIs to be reserved for PMP SVCs. The default is 555 on <i>ASX</i> -1200 switches and on <i>TNX</i> -1100 switches with SM-1100-B switch fabrics. The default is 255 on all other switch platforms.

For example, to set the minimum reserved VCI to 100, which effectively increases the PMP reserved VCI range to support the creation of 156 PMP SVCs, enter the following:

myswitch::configuration switch> pmpminvci 100

13.12 Configuring Memory Pools

These commands let you allocate memory pools of various data structures that are involved in call setups. These pools are considered to be the minimum numbers required for each type of connection. As a parameter's value is increased, the pools become larger and increase memory requirements. Similarly, as a parameter's value is decreased, the pools shrink and memory is freed. Any increases to these pools take effect immediately and are maintained over switch reboots. However, decreases may be slightly delayed if the parameters are changed and the data structures that are needed to change the pool size are already in use. For example, if you decrease the number of point-to-point calls from 500 to 300 and all of the calls are in use, that pool will not shrink until 200 calls have been released.

Typical values for these pools depend greatly on the requirements of your particular network. There is no specific maximum value for the pool sizes; they are only limited by the amount of memory available at the time of configuration. However, a pool configuration fails when there is not enough memory, or when there is memory available, but it is not available in the required block sizes (due to memory fragmentation). It is possible to allocate all of the memory to a pool by setting the pool to a very large value. Similarly, you can release all of the memory from a pool by setting the value to 0.

CAUTION



You should adjust these values only after careful consideration of your network's needs. It is important not to allocate more connections than you can possibly use when setting these pool sizes. When pools are configured, the memory in those pools is not available to any other operations such as the creation of static entities (PVCs, SPVCs, static routes, UPC contracts, etc.), call recording, and performance monitoring. Improper configuration can have an adverse effect on your network's operation.

You can configure the amount of memory allocated for call processing. The default memory pools setting is 2.0 MB on a 16 MB SCP and 2.8 MB on a 32 MB SCP. If you have too many PVCs, you can change the default configuration for point-to-point calls, or point-to-multipoint calls, or both to 0.

You can display the list of available subcommands by typing? at the pools level.

myswitch::configuration switch pools> ?
pp pmp show

13.12.1 Configuring the Pool for Point-to-Point Calls

This command lets you reserve memory for a specific number of total point-to-point calls for this switch.

myswitch::configuration switch pools> pp <no-of-point-to-point-calls>

This parameter is defined as follows:

Parameter	Description
no-of-point-to-point calls	The number of point-to-point calls you want to pre-allocate for this switch. The default is 256 calls for an SCP that has 16 MB of DRAM. The default is 512 calls for an SCP that has 32 MB of DRAM. The default is 1,024 calls for an SCP that has 64 MB of DRAM.



The SVC part of SPVC connections uses the pool resources for point-to-point calls.

13.12.2 Configuring the Pool for Point-to-Multipoint Calls

This command lets you reserve memory for a specific number of total point-to-multipoint calls for this switch.

myswitch::configuration switch pools> pmp <no-of-point-to-multipoint-calls>

This parameter is defined as follows:

Parameter	Description
no-of-point-to-multipoint calls	The number of point-to-multipoint calls you want to pre-allocate for this switch. The default is 8 calls for an SCP that has 16 MB of DRAM. The default is 32 calls for an SCP that has 32 MB of DRAM. The default is 64 calls for an SCP that has 64 MB of DRAM.

13.12.3 Displaying Configured Pools

This command lets you display the pools that are configured on this switch. The default values will vary depending on the type of SCP installed in the switch.

The fields in this display are defined as follows:

Field	Description
Point-to-point Calls	Shows how many point-to-point calls you have reserved memory for on this switch.
Point-to-Multipoint Calls	Shows how many point-to-multipoint calls you have reserved memory for on this switch.

13.13 Displaying the Switch Configuration

This command lets you display switch configuration information.

```
myswitch::configuration switch> show
Switch 'fishtank', Type asx200bx, up 0 days 08:26
Hardware version 0, Software version S_ForeThought_6.0.0 FCS (1.25816)
Software License
                                      Base
Maximum Virtual Path Connections
                                      32768
Maximum Virtual Channels
                                      16384
Fabric ID (MAC Address)
                                     00:20:48:1c:1f:4e (Default)
SPANS address
                                     00000038f21c1f4e
PMP Minimum Reserved VCI
                                     155
PMP Maximum Reserved VCI
                                      255
Switch TimeZone
                                      N/A
PVC/PVP Connection Preservation
                                     enable
                                     disabled
ATM Layer OAM Processing
Clock Scaling Factor
```

The fields in this display are defined as follows:

Field	Description
Software License	The license key and level of software license configured on this switch. Either shows the license key and one of the following levels in parentheses: Enterprise, Extended Enterprise, Traffic Engineering, or Gold; or shows one of the default licenses of Base or Legacy. If the switch has just been upgraded and is not an ASX-4000, the default license is Legacy. Otherwise, the default license is Base.
Switch	The user-configured switch name. If this field reads ATM Switch, then the switch name has not been set. Use conf switch name to assign a name.
Туре	Shows what kind of switch this is.
up	The amount of time, in days, hours, and minutes, since this switch has been rebooted.
Hardware version	The hardware version of the switch.
Software version	The version of software running on the switch.
Maximum Virtual Path Connections	The maximum number of virtual paths that can be configured.
Maximum Virtual Channels	The maximum number of virtual channels that can be configured.
Fabric ID (MAC address)	The unique, six-byte MAC address for this switch. (Default) means that the switch is using the default factory-configured fabric ID for this switch. (Configured) means that the switch is using the user-configured fabric ID for this switch.

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Field	Description
SPANS address	The unique, factory-configured SPANS address for this switch.
PMP Minimum Reserved VCI	The bottom number for the range of VCIs to be reserved for point-to-multipoint (PMP) SVCs.
PMP Maximum Reserved VCI	The top number for the range of VCIs to be reserved for point-to-multipoint (PMP) SVCs.
Switch TimeZone	The time zone configured for this ATM switch. If this field reads ${\tt N/A}$, then the switch time zone has not been set. Use ${\tt conf}$ switch timezone to assign a time zone.
PVC/PVP Connection Preservation	enable means connection preservation will occur for all PVCs and PVPs in this switch. disable means connection preservation will not occur on this switch.
ATM Layer OAM Processing	Shows if OAM cell processing is enabled or disabled on this switch board. disabled means OAM cell processing is stopped on all ports on this board, despite the conf port aisrdi settings. enabled returns all ports on this board to their last conf port aisrdi settings before this functionality was disabled.
Clock Scaling Factor	The factor by which the clock is scaled for traffic policing.

13.14 Setting the Time Zone

This command lets you set the time zone for your switch. You should set this before you set the time and date on the switch using the oper date command.

```
myswitch::configuration switch> timezone (none | timezone)
```

This parameter is defined as follows:

Parameter	Description
none	Allows you to disable the time zone setting that has been previously configured. This is useful if you entered a time zone incorrectly or if you no longer want a time zone set.
timezone	The time zone configured for this ATM switch. The switch supports and automatically converts from Standard to Daylight Savings time for the following time zones: EST5EDT (Eastern Standard Time), CST6CDT (Central Standard Time), MST7MDT (Mountain Standard Time), PST8PDT (Pacific Standard Time), AKST9AKDT (Alaska Standard Time).

Locations outside of the time zones listed above must supply the following POSIX standard 1003.1-1988 formula for switching between Daylight Savings Time and Standard Time:

These parameters are defined as follows:

Parameter	Description
std and dst	Indicates 3 or more bytes that designate standard (std) or Daylight Savings Time (dst). Only std is required; if dst is omitted, then it does not apply in this location. You can use uppercase or lowercase letters and any characters, except a leading colon(:), digits, comma (,), minus (-), plus (+), and ACSII NUL.
offset	The value to add to local time to equal Greenwich Mean Time. offset is of the form:
	hh[:mm[:ss]]
	Hour (hh) is required and can be a single digit between 0 and 24. Minutes (mm) and seconds (ss) are optional and are between 0 and 59. If no offset follows dst, it is assumed to be one hour ahead of std. If preceded by a "-", the time zone is east of the Prime Meridian; otherwise it is west (with an optional "+").

Parameter	Description
start[/time], end[/time]	start indicates the date when the change occurs from std to dst. end indicates the date when you change back. Both start and end are of the form:
	Mm.n.d
	d is the d-th day $(0 \le d \le 6)$ of week n of month m of the year $(1 \le n \le 5, 1 \le m \le 12)$, where week 5 is the last d day in month m, which can occur in either the fourth or the fifth week). Week 1 is the first week in which the d-th day occurs. Day 0 is Sunday. time is of the same format as offset, except that no leading "-" or "+" is allowed. If time is not entered, the default of 02:00:00 is used.

This example shows how to configure a switch in the eastern time zone using the standard default of 1 hour for the difference between std and dst. In this example, dst starts on the first Sunday in April at 2:00AM and ends on the last Sunday in October at 2:00AM.

```
myswitch::configuration switch> timezone EST5EDT,M4.1.0/02:00,M10.5.0/02:00
```

This example shows how to configure a switch that sets the time zone with a deviation of exactly 1 hour from GMT for std time and 2 hours from GMT for dst. In this example, dst starts on the first Sunday in April at 2:00AM and ends on the last Sunday in October at 2:00AM.

```
myswitch::configuration switch> timezone std01:00:00dst02:00:00,M4.1.0/
02:00,M10.5.0/02:00
```

This example shows that no offset time follows dst, which assumes dst is one hour ahead of std.

```
myswitch::configuration switch> timezone std01:00:00dst,M4.1.0/02:00,M10.5.0/
02:00
```

If you configure a date that falls during dst when you are currently in std, the date gets changed forward by one hour to reflect dst. For example:

```
myswitch::operation> date
Nov 19 10:03:03 1998 EST5EDT

myswitch::operation> date 05/01/1998 10:03:50

myswitch::operation> date
May 1 11:03:51 1998 EST5EDT
```

Switch Configuration Commands

If you configure a date in std when you are currently in dst, the date gets changed backward by one hour to reflect std. For example:

```
myswitch::operation> date
May 1 11:03:51 1998 EST5EDT

myswitch::operation> date 11/19/1998 10:04:20

myswitch::operation> date
Nov 19 09:04:21 1998 EST5EDT
```

CHAPTER 14

System Configuration Commands

These commands let you configure dual SCP functionality, configure the transfer protocol to be used when transferring files, configure system message log features, configure the amount of time of non-activity after which an AMI session times out, and change the units for designating UPC contracts. You can display the list of available subcommands by typing? at the system level.

myswitch::configuration system> ?
show dualscp> prompt protocol
syslog> timeout units

14.1 Displaying System Information

This command lets you display the amount of time of non-activity after which an AMI session will time out and display what type of units will be used when designating UPC contracts. You can get to this level by entering **show** at the **system** level. Enter the following parameters:

myswitch::configuration system> show

AMI Session Timeout off
File transfer protocol tftp
UPC Units cps

The fields in this display are defined as follows:

Field	Description
AMI Session Timeout	The number of minutes of no activity after which an AMI session will time out and exit you out of the session. The default is 5 minutes. A value of off means that the AMI session will not time out.
File transfer protocol	ftp means that FTP is the transfer protocol that is being used when performing file transfers on this SCP and tftp means that TFTP is being used.
UPC Units	cps indicates that UPC contracts are being configured and displayed in cells per second. kbps means that UPC contracts are being configured and displayed in kilobits per second. The default is cps.

14.2 Dual SCP Configuration Commands

These commands let you configure failover support in the *ASX*-200BX, *ASX*-1000, *ASX*-1200, *TNX*-210, or *TNX*-1100 when two SCPs are installed in a single switch fabric.



Only HA-based SCPs or Pentium-based SCPs support dual SCP configuration. Using an earlier version SCP in a redundant configuration can cause irreparable damage to your switch fabric.

These commands are not available locally on an *ASX*-200WG, an LE 155, an LE 25, an *ESX*-3000, nor an *ASX*-4000.

For proper synchronization of information between SCPs, ensure that the amount of free space on both SCPs is roughly equal before performing these commands.

myswitch::configuration system> dualscp ?

autoremove autosync failover primary reset show switchover synchronize

threshold

14.2.1 Configuring Dual SCP Automatic File Removal

You can configure the standby SCP to automatically delete unused files (i.e., old versions of switch software), if necessary, when files are being synchronized by the controlling SCP. Enter the following to enable or disable the autoremove feature:

myswitch::configuration system dualscp> autoremove (enable | disable)

These parameters are defined as follows:

Parameter	Description
enable	Indicates that autoremove is enabled on the standby SCP. When enabled, the SCP automatically deletes unused files and directories as needed.
disable	Indicates that autoremove is disabled on the standby SCP. If disabled, you are not prompted and synchronization attempts fail in the event that there is not enough free space in FLASH. This is the default.

This feature removes old copies of the OS if no space is available during the synchronization process. When the OS is being synchronized, this feature also removes the CURRENT copy of the OS if that is the only file that can be deleted to make room for the new OS.



When synchronizing the FLASH, the controlling SCP first instructs the standby SCP to delete any files in its FLASH that are not on the controlling SCP's FLASH. This could remove older copies or the CURRENT copy of the OS, if those versions of the OS are not already present on the controlling SCPs FLASH.

14.2.2 Configuring Dual SCP Automatic Synchronization

When in dual SCP mode, you can configure the controlling SCP to perform file automatic synchronization with the <code>autosync</code> command. If <code>autosync</code> is enabled, the CDB is saved to the standby SCP every time the CDB is written to FLASH on the controlling SCP. The standby SCP then rereads the CDB once it has been completely received. In addition, you can configure the controlling SCP to automatically copy the password file to the standby SCP if changes are made to it.



The automatic synchronization of the CDB and password file can be disabled, but you must remember to manually update these files to the standby SCP when they are modified on the controlling SCP.

To configure automatic synchronization, enter the following at the prompt:

myswitch::configuration system dualscp> autosync (enable | disable)

These parameters are defined as follows:

Parameter	Description
enable	Indicates that automatic synchronization will be enabled on the SCP. This is the default.
disable	Indicates that automatic synchronization will not be enabled on the SCP.

CAUTION



Enabling autosync does not cause the automatic synchronization of switch software; only the CDB, password file, and other system configuration files are synchronized.

14.2.3 Configuring SCP Failover

This command lets you enable or disable failover to a second SCP in the event of a hardware failure on the controlling SCP.

CAUTION



If failover is disabled, the standby SCP will not take control of the switch fabric if the controlling SCP fails, regardless of how other dualscp parameters are set.

To configure failover, enter the following at the prompt:

myswitch::configuration system dualscp> failover (enable | disable)

These parameters are defined as follows:

Parameter	Description
enable	Indicates that SCP failover will be enabled. This is the default.
disable	Indicates that SCP failover will be disabled.

14.2.4 Configuring the Controlling SCP

This command lets you designate which SCP is to control the switch at start-up. To designate the primary SCP, enter the following at the prompt:

myswitch::configuration system dualscp> primary (X | Y)

These parameters are defined as follows:

Parameter	Description
X	Indicates that the SCP in the left slot of the <i>ASX</i> -200BX or <i>TNX</i> -210 switch fabric (the top slot in an <i>ASX</i> -1000, <i>ASX</i> -1200, or <i>TNX</i> -1100) is the primary SCP. This is the default.
Y	Indicates that the SCP in the right slot of the <i>ASX</i> -200BX or <i>TNX</i> -210 switch fabric (the bottom slot in an <i>ASX</i> -1000, <i>ASX</i> -1200, or <i>TNX</i> -1100) is the primary SCP.



The primary SCP and the controlling are not necessarily the same. "Primary" refers to the SCP that is supposed to control the switch after it boots. "Controlling" refers to the SCP that actually controls the switch. For example, if the SCP in slot X fails at start-up, the SCP in slot Y controls the switch even though it is not designated as the primary SCP.

14.2.5 Resetting the Standby SCP

This command lets you force the standby SCP to reboot. To do this, enter the following at the prompt:

```
myswitch::configuration system dualscp> reset
```

You are asked to confirm this command. Type y at the prompt to reset the standby SCP. Type n or press < Enter> at the prompt to cancel the command.

```
myswitch::configuration system dualscp> reset
Reset the standby processor [n]? y

Dual SCP synchronization pending or in progress.

Aborting the synchronization can leave the standby SCP
in a bad state when FLASH or the OS is being synchronized.
```

CAUTION

Reset the standby anyway [n]? n



If you receive the above message that dual SCP synchronization is pending or in progress, you should <u>always</u> say no (type n). If you reset at this point, you could lose data or corrupt the standby SCP. Wait a minute or two for the synchronization to complete and try the reset again.

14.2.6 Displaying Dual SCP Information

This command lets you display the settings for dual SCP mode. To view these settings, enter the following at the prompt:

```
myswitch::configuration system dualscp> show

Auto CDB Sync Sync

SCP State Primary Failover Threshold Remove SyncMode Requests Failures

3X dual X enable 2 secs enable automatic 3 4

Synchronization queue: empty

Synchronization state: Idle
```

The fields in this display are defined as follows:

Field	Description
SCP	The SCP for which the information is being displayed. For example, 3X indicates that information for the SCP in slot X of switch fabric 3 is being displayed.
State	The state of the SCP. standalone means that there is only one SCP in the switch fabric. dual means that there are two SCPs installed in the switch fabric, and the SCPs are communicating with one another. other means that there are two SCPs installed in the switch fabric, but they are not communicating with one another.
Primary	Shows which SCP (X or Y) is the primary SCP. The SCP in slot X is set to primary by default.
Failover	Shows if failover is enabled on the switch fabric. failover is enabled by default.
Threshold	The amount of time, in seconds, that the standby SCP waits to receive a heartbeat from the controlling SCP before taking control of the switch. The minimum and default threshold value is 2 seconds.
Auto Remove	Shows if autoremove is enabled on the standby SCP. autoremove is disabled by default.
CDB SyncMode	automatic means that CDB synchronization occurs automatically (autosync is enabled on the controlling SCP). manual means that CDB synchronization does not occur automatically (autosync is disabled on the controlling SCP). The default is automatic.
Sync Requests	The number of synchronization requests that have been made between the controlling and standby SCP.
Sync Failures	The number of synchronizations requests that have failed between SCPs.
Synchronization queue	The number of synchronization requests waiting to be processed.
Synchronization state ¹	The state of the current synchronization attempt between the controlling and standby SCP. Suspended means either that the switch is not in dual SCP mode, or that the SCPs are running different versions of switch software. Idle means that synchronization is not taking place between SCPs. Manual means that a manual synchronization is taking place between SCPs. Automatic means an automatic synchronization is taking place between SCPs.

When manual or automatic synchronization is taking place between SCPs, the name of the file being synchronized is also displayed.

14.2.7 Switching over to the Standby SCP

If you wish to force the standby SCP to take control of the switch, this command provides the ability to force a switchover from the controlling to the standby SCP. To force the standby SCP to take control of the switch, enter the following at the prompt:

```
myswitch::configuration system dualscp> switchover
```

You will be asked to confirm this command. Type $_{\mathtt{Y}}$ at the prompt to reset the backup SCP. Type $_{\mathtt{n}}$ or press <==the prompt to cancel the command.

```
myswitch::configuration system dualscp> switchover
Switch over to the standby processor [n]? n
```

If you answer **y** to the above question, you will be prompted with the following question only if the standby SCP is in the process of synchronizing with the controlling SCP:

Dual SCP synchronization pending. continue anyway [n]? n

CAUTION



If this question is displayed, you should <u>always</u> answer **n**. Wait until the synchronization process is complete, then try the switch over again. If you switch over during the synchronization process, you will lose your configuration information.

14.2.8 Synchronizing Files Manually

To ensure a reliable failover mechanism, the information contained on both SCPs should be synchronized. Synchronizing the FLASH between SCPs is requested manually by the user via AMI. The CDB, password file, LECS configuration, and switch software version can also be synchronized between SCPs.

The conf system dualscp autoremove feature deletes old copies of the OS if no space is available during the synchronization process. When the OS is being synchronized, that feature also deletes the CURRENT copy of the OS if that is the only file that can be deleted to make room for the new OS.



When synchronizing the FLASH, the controlling SCP first instructs the standby SCP to delete any files in its FLASH that are not on the controlling SCP's FLASH. This could remove older copies or the CURRENT copy of the OS, if those versions of the OS are not already present on the controlling SCPs FLASH.

To synchronize information between SCPs, enter the following:

```
myswitch::configuration system dualscp> synchronize (Flash | CDB | LECS | OS | Password | Securid | Secret |Init | Loader)
```

These parameters are defined as follows:

Parameter	Description
Flash	Indicates that all directories and files in FLASH on the controlling SCP will be copied to the standby SCP.
CDB	Indicates that the Configuration Database (CDB) will be copied from the controlling to the standby SCP.
LECS	Indicates that the LAN Emulation Configuration Services (LECS) configuration database file will be copied from the controlling to the standby SCP.
OS ¹	Indicates the switch software will be copied from the controlling SCP to the standby SCP.
Password	Indicates that the password file will be copied from the controlling SCP to the standby SCP. The password file contains all of the userid information.
Securid	Indicates that the SecurID sdconf . rec configuration file will be copied from the controlling SCP to the standby SCP.

Parameter	Description
Secret	Indicates that the SecurID node secret file will be copied from the controlling SCP to the standby SCP.
Init	Indicates that the FLASH on the standby SCP will be re-initialized.
Loader	Indicates that the Mini Loader will be copied from the controlling to the standby SCP.

^{1.} Only the version of switch software to which Current is pointing is copied to the standby SCP.



When synchronizing the FLASH, the conf system dualscp autoremove command is ignored.

CAUTION



Using the Init option formats the FLASH on the standby SCP. This removes all information from the FLASH.

Once synchronization is complete, reset the standby SCP from the active SCP by entering the following at the prompt:

myswitch::configuration system dualscp> reset
Reset standby processor [n]? y



Make sure that the FLASH, CDB, password file, LECS configuration file, Securid, Mini Loader, and switch software have been synchronized between SCPs before performing the reset.

14.2.9 Setting the Failover Threshold

This command lets you set the threshold time, in seconds, that the standby SCP will wait to receive a heartbeat from the controlling SCP before taking control of the switch. Enter the following at the prompt:

myswitch::configuration system dualscp> threshold <seconds>

This parameter is defined as follows:

Parameter	Description
seconds	The threshold time, in seconds, that the standby SCP waits for a heartbeat from the controlling SCP. The minimum and default value is 2 seconds.

14.3 Displaying or Changing the Prompt

This command allows you to display the prompt name on the switch. Enter prompt at the system level as follows:

```
myswitch::configuration system> prompt
Current prompt is : myswitch
```

This command also lets you change the prompt name on the switch. Enter the following:

```
myswitch::configuration system> prompt ?
myswitch::configuration system> prompt [-default | <new-prompt>]
```

These parameters are defined as follows:

Parameter	Description
default	Changes the prompt name to match the switch name that was set using conf switch name. If the name was null, changes the prompt to ATM SWITCH::>. After an oper cdb init, changes the prompt to ATM SWITCH::>.
new-prompt	Allows you to change the prompt name to something other than the switch name that was set using conf switch name.

Changing the prompt name using the <new-prompt> option overrides the default prompt (which matches the switch name that has been set using conf switch name). The new prompt is stored in the CDB and persists across reboots.

When the switch name is changed using <code>conf switch</code> name, the prompt name changes immediately to match it, as long as the prompt name has not been changed explicitly using the <code>new-prompt></code> option. (If the switch name is changed using SNMP, you must log out and then log in again for the prompt name to change over to match the new switch name.) If you want to change the prompt name back to the default (switch name) prompt, use the <code>-default</code> option.



This command is useful for shortening the prompt name if the switch name is very long. However, if you change the switch name after you have changed the prompt name, ensure that you go back and update the prompt name.

If you open a remote AMI session using the open command, an asterisk (*) is displayed in front of the remote switch's prompt to designate which one is the local switch and which is the remote one. Remote switches always use the remote switch's name as the prompt.

14.4 Changing the System Protocol

This command lets you configure which transfer protocol is used when performing file transfers for the following AMI commands: conf lane lecs get, conf security login backup, and conf security login restore, oper upgrade, oper cdb backup, oper cdb restore, oper flash get, and oper flash put. To change the protocol that is used, enter the following parameters:

```
myswitch::configuration system> protocol [(ftp | tftp)]
```

This parameter is defined as follows:

Parameter	Description
ftp tftp	ftp means that FTP is the transfer protocol to be used when performing file transfers on this SCP and tftp means that TFTP is to be used. The default value is tftp.

To display the protocol that is currently being used, enter protocol at the system level:

```
myswitch::configuration system> protocol
Default transfer protocol : tftp
```

This field is defined as follows:

Parameter	Description
Default Transfer Protocol	ftp means that FTP is the transfer protocol that is being used when performing file transfers on this SCP and tftp means that TFTP is being used.

When the transfer protocol is set to FTP, each time that you use a command that requires the use of FTP, you are prompted for the remote userid and password of the remote host to which you are transferring a file or from which you are retrieving a file. For example:

```
myswitch::operation> upgrade <remotehost>:<full path to remotefile>
  Will upgrade directly to flash
  remote userid: <remote userid>
  remote password: <remote password>
```

14.5 System Log Configuration Commands

Syslog is a tool that can send system messages to be logged to a user-specified remote host. These commands let you configure the address of the remote syslog host and whether or not these messages are sent to the console. Enter syslog? at the system level to show the list of available syslog commands.

14.5.1 Displaying the Address of the System Log Host

This command allows you to display the address of the host to which the switch's system messages are logged. Enter the following parameters:



This command is only available on the local switch.

```
myswitch::configuration system syslog> show
Remote Syslog Host: 169.144.1.216
Syslog Facility: daemon
Console: enabled
```

If the host's address has never been set, or if it has been deleted and not set again, the following is shown:

```
myswitch::configuration system syslog> show

No remote syslog host set. Syslog messages will not be sent.

Syslog Facility: daemon

Console: enabled
```

14.5.2 Setting the Address of the System Log Host

This command sets the address of the host to which the switch's system messages are being logged. You may also opt to assign a specific facility name so that the remote syslog can automatically differentiate between switches with different facilities. Enter the following:



This command is only available on the local switch.

myswitch::configuration system syslog> set <address> [<facility>]

These parameters are defined as follows:

Parameter	Description
address	The IP address of the remote host to which the switch's system message logs are sent.
facility	The user-assigned name that identifies the facility this switch sends syslogs on. The default is daemon. Other valid values are local0 through local7. The names may be assigned in any order.

For example, to have a host with the address 192.88.243.118 be the recipient of the system log messages and to designate this switch's facility name as local2, enter the following:

```
myswitch::configuration system syslog> set 192.88.243.118 local2
Remote Syslog Host: 192.88.243.118
Syslog Facility is now local2
```

To assign the facility for other switches in your network, you must log in to each one locally and set the facility. You must keep track of which facility was assigned to each switch. Then, when you view the contents of the syslog file, they can be separated according to facility when messages from different facilities are logged on the same remote host.



If the switch panics, the panic file is automatically written to the syslog, provided that a syslog host had been set prior to the panic. This is especially useful if multiple panics occur, so that each is recorded.

14.5.3 Deleting the Address of the System Log Host

This command allows you to delete the address of the host to which the switch's system messages are being logged. Enter the following parameters:



This command is only available on the local switch.

```
myswitch::configuration system syslog> delete

Remove 192.88.243.118 as remote syslog host [n]? y

Remote syslog host removed. Syslog messages will not be sent.

Syslog Facility: local7
```

The switch prompts you to confirm that the address should be deleted. Entering y causes the switch to delete the address, as shown above. If you do not want the address to be deleted, enter n or press <re>RETURN></r> and you will be sent back to the syslog prompt.

Once the host's address has been deleted, the switch's system messages are no longer logged until a new host address is set. However, if a facility has been assigned to the switch, that facility assignment remains intact. So if you assign another host without changing the facility, the new host will list this switch's syslog messages under the same facility. For example,

```
myswitch::configuration system syslog> show
Remote Syslog Host: 169.144.48.41
Syslog Facility: local7

myswitch::configuration system syslog> delete
Remove 169.144.48.41 as remote syslog host [n]? y
Remote syslog host removed. Syslog messages will not be sent.

myswitch::configuration system syslog> show
No remote syslog host set. Syslog messages will not be sent.
Syslog Facility: local7

myswitch::configuration system syslog> set 204.95.89.84

Remote Syslog Host: 204.95.89.84

myswitch::configuration system syslog> show
Remote Syslog Host: 204.95.89.84

Syslog Facility: local7
```

14.5.4 Turning On/Off System Log Messages to the Console

On a switch, the system log messages may be directed to three places: to syslog, to the console, and to a remote host. These types of switches are defaulted to send log messages to both the console and to syslog. The console command can be used in different ways.

To display whether or not log messages are being output to the console, enter console without any arguments as follows:

```
myswitch::configuration system syslog> console
```

If the messages are being sent to the console, the following message is shown:

```
Syslog console output is enabled.
```

If the messages are not being directed to the console, the following message is displayed:

```
Syslog console output is disabled.
```

To enable log messages to be sent to the console, or to stop log messages from being output to the console, enter console with the appropriate argument as follows:

```
myswitch::configuration system syslog> console [(enable|disable)]
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that all log messages will be written to the console.
disable	Indicates that no log messages will be written to the console.

14.5.5 Enabling or Disabling the Logging of Changes

This command allows you to enable or disable the logging of all changes that occur on a switch via AMI, via SNMP, or via ILMI. Enter? at the audit level to show the list of available commands.

```
myswitch::configuration system syslog audit> ?
  show     ami     snmp     ilmi
```

14.5.5.1 Displaying the Auditing State

This command allows you to display whether the changes that occur on a switch via AMI, via SNMP, or via ILMI will be logged to syslog, and at what priority level those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> show
Facility Priority
ami debug
snmp notice
ilmi off
```

The fields in this display are defined as follows:

Field	Description
Facility	Shows for which facility the changes will be logged.
Priority	Shows with which priority level tag the changes will be logged.

You can also display the auditing state for a specific facility as follows:

```
myswitch::configuration system syslog audit> show [ami | snmp | ilmi]
myswitch::configuration system syslog audit> show ami
Facility Priority
ami debug
```

The fields in this display are defined in the same manner as those in the previous example.

14.5.5.2 Changing and Displaying the AMI Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via AMI. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> ami ?
usaqe:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of crit.
егг	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all AMI changes to syslog. This is the default state.



In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command conf system syslog set to do this.



Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful as a security feature for logging any minor modifications which occur after that.

The AMI syslog messages generally come in pairs with the result of the first message saying Pending, and the second message giving the outcome. There are some exceptions, such as any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The AMI syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: AMI :: userid :: IP address or serial port (where the user logged in) :: AMI command string :: result of command
```

For example, the output will be something similar to the following:

```
AUG 28 12:36:40 fishtank AMI :: ami :: 169.144.87.22 :: snmp off :: Pending AUG 28 12:36:41 fishtank AMI :: ami :: 169.144.87.22 :: snmp off :: Success
```

You can also display the auditing state for AMI by entering ami without a? as follows:

```
myswitch::configuration system syslog audit> ami
Facility Priority
ami debug
```

14.5.5.3 Changing and Displaying the SNMP Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via SNMP SETs. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> snmp ?
usaqe:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of crit.
егг	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all SNMP changes to syslog. This is the default state.



In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command conf system syslog set to do this.



Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful for logging any minor modifications which occur after that.

The SNMP syslog messages generally come in pairs with the result of the first message saying Pending, and the second message giving the outcome. There are some exceptions, such as the SNMP bad community message, or any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The SNMP syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: SNMP :: IP address :: SNMP request ID :: index of this varbind within the SNMP packet :: result of the command; either pending, success, error number, no change, or bad community :: object ID for this varbind :: value
```

For example, the output will be something similar to the following:

```
AUG 28 11:09:50 fishtank SNMP :: 127.0.0.1 :: 7d92 :: 1 :: pending :: .1.3.6.1.4.1.326.2.2.2.2.4.0 :: 2

AUG 28 11:09:50 fishtank SNMP :: 127.0.0.1 :: 7d92 :: 1 :: success :: .1.3.6.1.4.1.326.2.2.2.2.2.4.0 :: 2

AUG 28 10:59:21 fishtank SNMP :: 169.144.87.21 :: 289d98ca :: 1 :: bad community :: .1.3.6.1.2.1.2.2.1.7.3 :: 2
```

You can also display the auditing state for SNMP by entering snmp without a ? as follows:

```
myswitch::configuration system syslog audit> snmp
Facility Priority
snmp off
```

14.5.5.4 Changing and Displaying the ILMI Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via ILMI. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> ilmi ?
usage:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of crit.
егг	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all ILMI changes to syslog. This is the default state.



In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command conf system syslog set to do this.



Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful for logging any minor modifications which occur after that.

The ILMI syslog messages generally come in pairs with the result of the first message saying Pending, and the second message giving the outcome. There are some exceptions, such as any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The ILMI syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: ILMI :: port VPI VCI on which the request arrived for ILMI :: SNMP request ID :: index of this varbind within the SNMP packet :: result of the command; either pending, success, error number, no change, or bad community :: object ID for this varbind :: value
```

For example, the output will be something similar to the following:

```
AUG 28 11:10:54 fishtank ILMI :: 1A2 0 16 :: 432b :: 1 :: pending :: 1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1

AUG 28 11:10:54 fishtank ILMI :: 1A2 0 16 :: 432b :: 1 :: success :: 1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1

AUG 28 11:10:54 fishtank ILMI :: 1A1 0 16 :: 4330 :: 1 :: pending :: 1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1

AUG 28 11:10:54 fishtank ILMI :: 1A1 0 16 :: 4330 :: 1 :: success :: 1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
```

You can also display the auditing state for ILMI by entering ilmi without a? as follows:

```
myswitch::configuration system syslog audit> ilmi

Facility Priority
ilmi notice
```

14.6 AMI Timeout Configuration Command

This command lets you set the amount of time of non-activity after which an AMI session will time out. You can get to this level by entering timeout at the system level. Enter the following parameters:

myswitch::configuration system> timeout <minutes>

This parameter is defined as follows:

Parameter	Description
minutes	The number of minutes of non-activity after which an AMI session will time out and exit you out of the session. The default is 5 minutes. To configure the switch so that an AMI session does not time out, enter 0. It is displayed as off when you use conf system show. ¹

^{1.} If you disable the timeout and then lose connectivity to your telnet session, and you are not able to access the serial port, you may have to wait up to 20 minutes before you can re-establish the connection.

14.7 Configuring the Units for UPC Contracts

This command allows you to change the type of units that are being used when configuring and displaying UPC contracts. You can get to this level by entering units at the system level. Enter the following parameters:

myswitch::configuration system> units (cps | kbps)

This parameter is defined as follows:

Parameter	Description
units	Using cps indicates that UPC contracts are being configured and displayed in cells per second. Using kbps means that UPC contracts are being configured and displayed in kilobits per second. The default is cps.

CHAPTER 15

Timing Configuration Commands

These commands let you configure distributed timing on a switch. You can display the list of available subcommands by typing? at the timing level.

15.1 Configuring the Timing Mode

This command lets you configure the method of timing operation used on the switch. Enter the following parameters:

myswitch::configuration timing> mode (switch | tcm)

These parameters are defined as follows:

Parameter	Description
switch	All network modules that support distributed timing import their clock source from the port designated under conf timing switchclock. This is the default mode.
tcm	All network modules that support distributed timing import their clock source from the Timing Control Module (TCM). If either of the primary or secondary clocks (set under conf timing switchclock) are on this switch, they are exported as the board primary and secondary clocks. The TCM must also be configured either to use these clocks (under conf cec timing), or to provide a BITS or the on-board oscillator as a timing source for the switch fabrics. You must have a TCM installed in your switch to use this mode.



For more information about configuring timing using the switch mode, see the ATM Switch Network Configuration Manual. For more information about configuring timing using the tem mode, see the CEC-Plus Installation and User's Manual that came with your TCM.

15.2 Displaying Timing Information

This command lets you show the timing configuration on a switch fabric. Enter the following:

```
myswitch::configuration timing> show

Mode Primary Secondary Current

switch N/A N/A localCrystalClock
```

The fields in this display are defined as follows:

Field	Description
Mode	The method of timing being used by the switch. switch means all network modules that support distributed timing import their clock source from the port designated under conftiming switchclock. tcm means all network modules that support distributed timing import their clock source from the TCM.
Primary	The port that has been configured as the primary switchclock for all of the network modules on all of the boards in this switch. These are the sources that this board is offering as primary timing sources. Any further behavior is dependent on the current mode.
Secondary	The port that has been configured as the secondary switchclock for all of the network modules on all of the boards in this switch. These are the sources that this board is offering as secondary timing sources. Any further behavior is dependent on the current mode.
Current	The current switchclock source for all of the network modules on all of the boards in this switch. If neither the primary nor secondary clocks are available, the switch fabric uses the crystal of the first available timing network module as the switchclock, going from A to D. For example, if network module A supports distributed timing, then the crystal from A is used as the switchclock. As another example, if network module A is not installed, and network modules B and C do not support distributed timing, but network module D does support distributed timing, then the crystal from D is used as the switchclock.

15.3 Configuring the Switchclock

This command lets you configure the primary or secondary switchclock on a switch fabric. Enter the following parameters:

myswitch::configuration timing> switchclock (primary | secondary) (<bnp> | none)

These parameters are defined as follows:

Parameter	Description
primary	The specified port will be designated as the primary switchclock.
secondary	The specified port will be designated as the secondary switchclock.
bnp	The number of the port that will be designated as the primary or secondary switchclock.
none	Resets the switchclock to the default values.



On an LE 155 and an LE 25, the ports in the Port Expansion Module (PEM) (interface group D) are the only ports that can export a clock source for distributed timing. On an *ESX*-3000, the first port of each interface group on the ATM port cards (e.g., 5C1 or 3B1) are the only ports that can export a clock source for distributed timing. For more information about configuring distributed timing, see Chapter 9 of the *ATM Switch Network Configuration Manual*.

Timing Configuration Commands

CHAPTER 16 Configuring the Traffic Descriptor Table

These commands let you configure the traffic descriptor table on a switch. You can display the list of available subcommands by typing ? at the trafdesc level.

16.1 Deleting a Traffic Descriptor Entry

This command lets you remove an entry from the traffic descriptor table. Enter the following parameters:

myswitch::configuration trafdesc> delete <index>

This parameter is defined as follows:

Parameter	Description
index	Indicates the index number of the entry that you want to delete. Look in the Row field under conf trafdesc show to find this number. Row 1, which is the default, cannot be deleted.

16.2 Creating a Traffic Descriptor Entry

This command lets you add an entry to the traffic descriptor table. This command lets you configure the ATM traffic descriptor parameters to be used while setting up an SVCC RCC. This table entry is referenced by the <code>-svcctrix</code> option under <code>conf atmr pnni node new</code> and <code>modify</code>. Enter the following:

These parameters are defined as follows:

Parameter	Description
index	The user-assigned index number of the entry that you want to create.
type	The ATM Forum defined ATM traffic descriptor type. Currently, only the following traffic descriptor type is valid for use with SVCC RCCs: atmClpTaggingScr - This traffic descriptor is for CLP with Sustained Cell Rate and no tagging.
parm1	For atmClpTaggingScr, this parameter is CLP=0+1 peak cell rate in cells per second.
parm2	For atmClpTaggingScr, this parameter is CLP=0 sustained cell rate in cells per second.
parm3	For atmClpTaggingScr, this parameter is CLP=0 maximum burst size in cells.
parm4	This parameter is currently not used.
parm5	This parameter is currently not used.
-qos <qos></qos>	This parameter is currently not used.

You can create a different traffic descriptor entry for the type ${\tt atmClpTaggingScr}$ using values other than the default values. For example:

myswitch::configuration trafdesc> new 2 atmClpTaggingScr 1000 500 200 0 0

16.3 Displaying Traffic Descriptor Information

This command lets you show the traffic descriptor table. Enter the following:

myswit	ch::configuration	trafdesc> sho	w				
Row	TrafficDescrType	Parm1	Parm2	Parm3	Parm4	Parm5	QoS
1	atmClpTaggingScr	906	453	171	0	0	0
2	atmClpTaggingScr	1000	500	200	0	0	0

The fields in this display are defined as follows:

Field	Description
Row	Indicates the index number of this entry.
TrafficDescrType	The ATM Forum defined ATM traffic descriptor type. Currently, only the following traffic descriptor type is valid for use with SVCC RCCs: atmClpTaggingScr - This traffic descriptor is for CLP with Sustained Cell Rate and no tagging.
Parm1	For atmClpTaggingScr, this parameter is CLP=0+1 peak cell rate in cells per second. The default is 906 cells per second.
Parm2	For atmClpTaggingScr, this parameter is CLP=0 sustained cell rate in cells per second. The default is 453 cells per second.
Parm3	For atmClpTaggingScr, this parameter is CLP=0 maximum burst size in cells. The default is 171 cells.
Parm4	This parameter is currently not used.
Parm5	This parameter is currently not used.
QoS	This parameter is currently not used.

You can also display information for just a specific index as follows:

```
myswitch::configuration trafdesc> show [<index>]
myswitch::configuration trafdesc> show 1
      TrafficDescrType
                             Parm1
                                      Parm2
                                               Parm3
                                                        Parm4
                                                                 Parm5
                                                                          Oos
1
                             906
                                      453
                                               171
                                                        0
                                                                 0
                                                                          0
      atmClpTaggingScr
```

The fields in this display are defined in the same manner as those in the previous example.

Configuring the Traffic Descriptor Table

CHAPTER 17 UPC Configuration Commands

These commands let you create, delete, or display usage parameter control (UPC) traffic contracts. These contracts can then be applied to PVCs using the conf vcc new or the conf vpc new command. You can display the list of available subcommands by typing upc? at the configuration level.

```
myswitch::configuration> upc ?
delete
                 new
                                   show
```

17.1 **Deleting a UPC Traffic Contract**

This command allows you to delete an existing UPC contract. Enter the following parameters:

```
myswitch::configuration upc> delete <index>
```

Creating a UPC Traffic Contract 17.2

This command lets you create a UPC contract. Enter the following parameters:

```
myswitch::configuration upc> new <index> ubr [aal5 [noPktDisc]] [ubrTagging] [AltCLP]
        [-estbw <kcps>] [-name <name>]
new <index> abr <pcr01> <mcr>> [-cdvt <us>] [noGCRA] [aal5 [noPktDisc] [PPPol]]
       [-name <name>]
 OR
new <index> <UPC> [-cdvt <us>] [noGCRA] [aal5 [noPktDisc] [PPPol]]
       [AltCLP] [-scheduling (roundrobin | smoothed | guaranteed)] [-name <name>]
Where UPC is one of the following combinations of traffic parameters:
       cbr <pcr01>
       cbr0 <pcr0> <pcr01> [tag]
       vbr <pcr01> <scr01> <mbs01>
       vbr0 cr01> <scr0> <mbs0> [tag]
Advanced options (to generate UPC contract from Frame Relay parameters):
 [[-bc <bits>][-be <bits>][-cir <kbps>][-ar <kbps>][-frsize <bytes>]]
```

The parameters for delete and new are defined as follows:

Parameter	Description
index	The integer index that refers to this specific traffic contract. Valid index numbers are from 0 to 32,767.
UPC	One of the types of traffic contracts shown above. The parameters in these contracts are defined as follows:
ubr	Indicates UBR traffic.
cbr	Indicates CBR traffic.
cbr0	Indicates CBR0 traffic.
vbr	Indicates VBR traffic.
vbr0	Indicates VBR0 traffic.
pcr0	Indicates the peak cell rate for cells with CLP = 0.
pcr01	Indicates the peak cell rate for all cells.
scr0	Indicates the sustainable cell rate for cells with $CLP = 0$.
scr01	Indicates the sustainable cell rate for all cells.
mbs0	Indicates the maximum burst size for cells with $CLP = 0$.
mbs01	Indicates the maximum burst size for all cells.
tag	tag means that non-conforming CLP = 0 cells are tagged. Otherwise, they are dropped. The default is that they are dropped. This option only applies to the PCR0 parameter of the CBR0 contract and to the SCR0 and MBS0 parameters of the VBR0 contract.
abr	Indicates ABR traffic. Currently, ABR UPC contracts are supported only on Series D network modules.
mcr	Indicates the minimum cell rate for all cells. ABR connections with an MCR equal to 0 use the roundrobin scheduling discipline. ABR connections with an MCR greater than 0 use the guaranteed scheduling discipline. However, if there are no suitable rate groups in the rate controller, the ABR connections with an MCR greater than 0 are rejected. Currently, ABR UPC contracts are supported only on Series D network modules.
-cdvt us	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds. If the CDVT is not specified here, the default CDVT value associated with the port will be used. (See conf port show and conf port cdvt for more information).
noGCRA	nogcra means that GCRA policing is disabled on CBR or VBR (depending on what is configured) connections using this contract. If nogcra is not entered, then GCRA policing is enabled on CBR or VBR (depending on what is configured) connections using this contract. By default, nogcra is not entered (GCRA policing is enabled). You must use the nogcra option when applying a UPC contract to the outbound signalling channel using the -outsigupc <upc-index> variable under conf signalling new to prevent the outbound signalling channel from being policed.</upc-index>
aal5	The connection is using the AAL5 Adaptation Layer.

Parameter	Description
noPktDisc	This parameter can only be used if the connection is AAL5 (i.e., the aal5 parameter is present). This parameter suppresses EPD/PPD (AAL5 packet discard) on the connection. The default is for this parameter not to be present (EPD/PPD is enabled) on AAL5 connections.
ubrTagging	ubrTagging means that all UBR traffic is tagged (set to CLP=1) on this connection. If ubrTagging is not entered, then UBR traffic is not tagged on this connection. This command only applies to UBR traffic. By default, UBR traffic is not tagged.
PPPol	Can only be used if the connection is AAL5 (i.e., the aal5 parameter is present). Indicates that Partial Packet Policing is going to be performed on this connection. The default is for this parameter not to be present, which leaves Partial Packet Policing disabled. The HDCOMP ASIC must be version 1 or greater to support AAL5 partial packet policing. To display the ASIC version, use the display hdcomp command.
AltCLP	Applies to connections on Series D network modules. It indicates that the alternate CLP threshold (configured using conf module traffic d altclpthresh) should be used for all connections created with this UPC contract. The default is for this parameter not to be present, which means the connections do not use the alternate CLP threshold.
-estbw <kcps></kcps>	Applies only to UBR SPVCs. Lets you assign an estimated bandwidth value, in kilocells per second, for individual UBR SPVCs. The value must be an integer from 0 to 65534. This value is used by the load-balanced UBR routing feature. See Section 4.3.1 in Part 1 of this manual for more information about load-balanced UBR routing.
-scheduling (roundrobin smoothed guaranteed)	The scheduling mode to be used for servicing traffic on the output side of a Series D network module. roundrobin means that all service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs. smoothed means that all service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second. guaranteed is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue. The -scheduling option has an effect only on connections with outputs on Series D network modules. All other network module platforms only use roundrobin scheduling.
-name <name></name>	The user-defined name associated with this UPC traffic contract. This helps you remember for what traffic type this specific contract is used. If you do not specify a name, a default name that relates to this type of traffic contract is assigned automatically.
-bc <bits></bits>	The committed burst size of a connection, in bits. Can only be used on a Frame Relay connection. The bc + be must be less than or equal to the ar.
-be <bits></bits>	The excess burst size of a connection, in bits. Can only be used on a Frame Relay connection. The bc + be must be less than or equal to the ar.
-cir <kbps></kbps>	The committed information rate of a connection, in kbps. Can only be used on a Frame Relay connection. The cir must be less than or equal to the ar. Entering 0 for this option means the traffic is treated as best-effort.

Parameter	Description
-ar <kbps></kbps>	The access rate of a Frame Relay UNI, in kbps. Can only be used on a Frame Relay connection. The default value is 64 . If you multiple timeslots are used, you must modify this value accordingly. The access rate for one timeslot is 64 Kbps, and the access rate for two timeslots is 128 Kbps, etc. The access rate for 24 timeslots (max. for DS1) is 1536 Kbps and the access rate for 31 timeslots (max. for E1) is 1984 Kbps.
-frsize <bytes></bytes>	The maximum payload frame size, in bytes. Can only be used on a Frame Relay connection. This value must not exceed 4,092. The default value is 4092.



The units for pcr0, pcr01, scr0, scr01, mbs0, and mbs01 are specified either in cells per second or in kilobits per second, depending on what you used for conf system units. To display the current setting, use conf system show. The default is cps (cells per second).

The following is an example of how to create a UPC contract:

myswitch::configuration upc> new 5 vbr0 500 200 250 -cdvt 1000 aal5 PPPol -name vbr0_upc

This example specifies a contract named "vbr0_upc", which is a VBR0 contract with an index of 5, a pcr01 of 500 cells/sec (or kbps), an scr0 of 200 cells/sec (or kbps), an mbs0 of 250 cells (or kilobits), a CDVT of 1,000 microseconds, and partial packet policing enabled.



For more information about traffic contracts, please refer to Table 5-7 in the ATM Forum UNI 3.0 Specification.



PVCs that use UPC contracts that contain any of the <code>[noGCRA]</code>, <code>[aal5 [noPktDisc][PPPol]]</code>, and <code>[ubrTagging]</code> parameters are valid only when the conf port gcrapolicing, conf port aal5packetdiscard, conf port pppolicing, and conf port ubrtagging parameters are set to <code>svcOn</code> or <code>svcOff</code>. Use conf port show <code>tm</code> to check these settings.

17.2.1 Configuring Advanced Options on UPC Contracts

The advanced options are only used on VBR Frame Relay PVCs that are output on Series D network modules. The -scheduling smoothed option must be used.

The following is an example of how to create a UPC contract for use on a Frame Relay PVC:

myswitch::configuration upc> new 3 vbr -bc 40 -be 10 -cir 40 -ar 64 -frsize 4092 -scheduling smoothed -name fratm vbr

You can then apply any UPC contract that uses advanced options to a Frame Relay PVC using the -faupc <index> and -afupc <index> options under conf fratm pvc new.



When the advanced options are used, they are converted to ATM UPC parameters and are displayed as ATM parameters.

17.3 Displaying the UPC Traffic Contracts

This command lets you display all of the UPC contracts. Enter the following parameters:

```
myswitch::configuration upc> show
Index PCR01 SCR01 MBS01
                                     SCR0
                                           MBS0
                                                    MCR
                                                          CDVT UBRBW
                                                                       TAG
                                                                              Name
                                                                          default_ubr
1
                                                              40000
                                                                             ubr
2
       10000
                                                    3000
                                                                              abr
```

The fields in this display are defined as follows:

Field	Description
Index	The UPC contracts listed by index number.
PCR01 ¹	The peak cell rate for all cells for this contract.
SCR01	The sustainable cell rate for all cells in this contract.
MBS01	The maximum burst size for all cells in this contract.
PCR0	The peak cell rate for cells with CLP=0 for this contract.
SCR0	The sustainable cell rate for cells with CLP=0 for this contract.
MBS0	The maximum burst size for cells with CLP=0 for this contract.
MCR	The minimum cell rate for all cells in this ABR contract.
CDVT	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds.
UBRBW	The estimated bandwidth value, in kilocells per second, for individual UBR SPVCs. This value is used by the load-balanced UBR routing feature. See Part 1 of this manual for more information about load-balanced UBR routing.
TAG	Tag means that non-compliant CLP=0 cells are tagged. No entry means that non-compliant cells are dropped. This option only applies to cells measured by the PCR0 parameter of the CBR0 contract and to cells measured by the SCR0 and MBS0 parameters of the VBR0 contract.
Name	The user-defined name associated with this UPC traffic contract.

^{1.} The units for PCR01, SCR01, MBS01, PCR0, SCR0, MBS0, and MCR are shown either in cps or in kbps, depending on what you used for conf system units. To display the current setting, use conf system show. The default is cps.

This command also lets you display all of the traffic management flags for the UPC contracts. Enter the following parameters:

```
myswitch::configuration upc> show [<index>] [flags]
myswitch::configuration upc> show flags
Index GCRApol PPpol AAL5 PktDisc UBRtag AltCLP Scheduling Name
0 roundrobin default_ubr
1 GCRApol guaranteed abr
2 GCRApol roundrobin abr
```

The fields in this display are defined as follows:

Field	Description
Index	The UPC contracts listed by index number.
GCRApol	GCRAPOl means that GCRA policing is enabled on connections that use this contract. If GCRAPOl is not displayed, then GCRA policing is disabled on all connections that use this contract.
PPpol	PPpol means that partial packet policing is enabled on connections that use this contract. If PPpol is not displayed, then partial packet policing is disabled on all connections that use this contract.
AAL5	AAL5 means that this is an AAL5 connection. If AAL5 is not displayed, then this is not an AAL5 connection.
PktDisc	PktDisc means that packet discard is enabled on connections that use this contract. If PktDisc is not displayed, then packet discard is disabled on all connections that use this contract.
UBRtag	UBRtag means that all UBR traffic is tagged (set to CLP=1) as non-compliant on connections that use this contract. If UBRtag is not displayed, then UBR traffic is not tagged on connections that use this contract.
AltCLP	This field only applies to connections on Series D network modules. It indicates that the alternate CLP threshold (configured using conf module traffic d altclpthresh) should be used for all connections created with this UPC contract. The default is for the connections not to use the alternate CLP threshold.
Scheduling	The scheduling mode that dictates the way traffic is serviced on the output side of a Series D network module. roundrobin means that all service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs. smoothed means that all service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second. guaranteed is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.
Name	The user-defined name associated with this UPC traffic contract.

UPC Configuration Commands

CHAPTER 18 VCC Configuration Commands

These commands let you configure Permanent Virtual Channels (PVCs) which are also called Virtual Channel Connections (VCCs). You can display the list of available subcommands by typing vcc ? at the configuration level.

myswitch::configuration> vcc ? batch delete show new

Batch Command for PVCs 18.1

This command lets you create or delete a large number of PVCs and/or SPVCs by executing an AMI command script that resides on the FLASH. This same command also exists under conf spvc pnni. To use this command, do the following:

1. Create an ASCII text script file on a host. This file should list all of the new commands or delete commands in the order in which you wish to create or delete the connections.



When creating the script, the syntax cannot be abbreviated in the commands; e.g., you must enter configuration instead of just conf.

- 2. Compress the script file with the gzip utility.
- 3. Load the script file on to the switch using the command oper flash get <host:remotefile> <localfile>.
- 4. Use the command conf vcc batch <file>[-delay <seconds>] to execute the script on the switch. This command sequentially executes every PVC and SPVC command in the file.

The script executes each command before proceeding to the next command. Some commands may be rejected; e.g., an attempt to create a second PVC with a particular VCI. The number of commands that succeed and fail are totalled separately and are displayed on the AMI console once all of the commands are complete.

The commands and specific options for these commands that are supported in the script include the following:

- configuration upc new <index> ubr [aal5 [noPktDisc]] [ubrTagging]
 [-name <name>]
- configuration upc delete <index>
- configuration vpt new <port> <vpi>[(term | orig)] [-minvci <vci>]
 [-maxvci <vci>]
- configuration vpt delete <port> <vpi>[(term | orig)]
- configuration vcc new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci> [-upc <index>]
 [-name <name>]
- configuration vcc delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
- configuration spvx spvcc pnni new <port> <vpi> <vci> <destnsap >

```
[-priority <priority>]
-spvcid <index> [-name <name>]
[-destvpi <vpi> -destvci <vci>]
[-reroute (enable|disable)]
[-ftpnniDtlIndex1 <index1> [-ftpnniDtlWeight1 <weight1>]]
[-ftpnniDtlIndex2 <index2> [-ftpnniDtlWeight2 <weight2>]]
[-ftpnniDtlIndex3 <index3> [-ftpnniDtlWeight3 <weight3>]]
[-ftpnniDtlIndex4 <index4> [-ftpnniDtlWeight4 <weight4>]]
[-backoff (enable | disable)]
```

- configuration spvx spvcc pnni delete <SPVC ID>
- configuration spvx spvpc new <port> <vpi> <destnsap>

```
[-priority <priority>]
-spvpcid <index>
[-name <name>] [-destvpi <vpi>]
[-reroute (enable|disable)]
[-fupc <index>] [-bupc <index>]
```

configuration spvx spvpc delete <SPVPC ID>

To use this command, enter the following parameters:

```
myswitch::configuration vcc> batch <file.gz> [-delay <seconds>]
```

These parameters are defined as follows:

Parameter	Description
file	The name of the script file that you want to run on the switch. This file must be compressed using the gzip utility.
delay	An optional delay, in seconds, that the switch waits before executing the script file.

18.2 Deleting a PVC

This command allows you to delete an existing PVC. Enter the following parameters:

```
myswitch::configuration vcc> delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
```

18.3 Creating a PVC

This command lets you create a new PVC. Enter the following parameters:

```
myswitch::configuration vcc> new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>\
[-upc <index>] [-name <name>]
advanced options:
[-inctype (orig | tran | term) -outctype (orig | tran | term) [pmp | mpmp | mpmp]]
```

The parameters for delete and new are defined as follows:

Parameter	Description
iport	The incoming port number.
ivpi	The incoming virtual path number.
ivci	The incoming virtual channel number.
oport	The outgoing port number.
ovpi	The outgoing virtual path number.
ovci	The outgoing virtual channel number.
-upc <index></index>	The integer index that refers to a specific UPC traffic contract. If no index is specified, then no traffic policing will take place on this VCI. It is assigned a UPC index of 0, and all traffic on this VCI is treated as UBR traffic. This is the default.
name	The name you want to assign to this PVC to identify it uniquely. It is useful for billing purposes so you can identify which PVCs are being used by which customers. Can be up to 32 ASCII characters long.
inctype	The channel connection type for the incoming channel. For billing purposes, it denotes on which switch this PVC is arriving. Originating) means that the ingress endpoint of the channel is connected to the source node which is outside the network, tran (transit) means that the ingress endpoint of the channel is connected to a node within the network, and term (terminating) means that the ingress endpoint of the channel is connected to the destination node which is outside the network.
outctype	The channel connection type for the outgoing channel. For billing purposes, it denotes on which switch this PVC is leaving. Orig (originating) means that the egress endpoint of the channel is connected to the source node which is outside the network, tran (transit) means that the egress endpoint of the channel is connected to a node within the network, and term (terminating) means that the egress endpoint of the channel is connected to the destination node which is outside the network.

Parameter Description						
pmp ¹	Indicates this is a point-to-multipoint PVC.					
трр	Indicates this is a multipoint-to-point PVC.					
mpmp	Indicates this is a multipoint-to-multipoint PVC.					

^{1.} By indicating pmp, mpp, or mpmp, you are only assigning a label for record keeping purposes. The switch does not necessarily create the type of PVC you have specified. If you assign a connection type, but do not assign a pmp, mpp, or mpmp label, the switch assigns a label of pp (point-to-point).

The following is an example of how to create a PVC which specifies the connection type:

```
myswitch::configuration vcc> new 3b1 0 100 3b4 0 100 -inctype tran -outctype tran
```

The following is an example of how to create a PVC which has a name assigned to it:

```
myswitch::configuration vcc> new 3b2 0 145 3b3 0 145 -name customer_a
```

The following is an example of how to create a simple PVC on an *ASX*-1000, *ASX*-1200, or *TNX*-1100. To create a vcc going in port 2A1, vpi 0, vci 100 on the switch board installed in slot 2 and going out port 4B1, vpi 0, vci 100 on the switch board installed in slot 4, enter the following:

```
myswitch::configuration vcc> new 2a1 0 100 2e4 0 100
myswitch::configuration vcc> new 2e4 0 100 2a1 0 100
myswitch::configuration vcc> new 4b1 0 100 4e2 0 100
myswitch::configuration vcc> new 4e2 0 100 4b1 0 100
```

In the first line in the first pair, notice that the output port is 2E4. This is the inter-fabric port. The 2 means the connection is coming out of the switch board in slot 2 through the inter-fabric port. The E represents the inter-fabric port. The 4 means the connection is destined for switch board in slot 4. 2E4 then becomes the input port in the second line.

In the first line in the second pair, notice that the output port is 4E2. This is the inter-fabric port. The 4 means the connection is coming out of the switch board in slot 4 through the interfabric port. The E represents the inter-fabric port. The 2 means the connection is destined for switch board in slot 2. 4E2 then becomes the input port in the second line.

VCC Configuration

18.4 Displaying PVCs

This command allows you to display existing PVCs. You can display either all of the existing PVCs on an individual switch fabric or all of the existing PVCs on a specific port. To list all of the existing PVCs on an individual switch fabric, enter the following parameters:

myswit	ch::cc	nfigu	uration	n vcc	> show	,		
Input		Out	tput					
Port	VPI	VCI	Port	VPI	VCI	UPC	Protocol	Name
3B1	0	5	3CTL	0	49	0	fsig	N/A
3B1	0	14	3CTL	0	48	0	spans	N/A
3B1	0	15	3CTL	0	47		spans	N/A
3B1	0	16	3CTL	0	50		fsig	N/A
3B1	0	100	3B4	0	100	0	pvc	N/A
3B2	0	5	3CTL	0	53	0	fsig	N/A
3B2	0	14	3CTL	0	52	0	spans	N/A
3B2	0	15	3CTL	0	51		spans	N/A
3B2	0	16	3CTL	0	54		fsig	N/A
3B2	0	145	3B3	0	145	0	pvc	customer_a
3B3	0	5	3CTL	0	57	0	fsig	N/A
Press	return	for	more,	q to	quit:	q		

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the virtual channel.
Input VPI	The incoming virtual path number.
Input VCI	The incoming virtual channel number.
Output Port	The outgoing port number of the virtual channel.
Output VPI	The outgoing virtual path number.
Output VCI	The outgoing virtual channel number.
UPC	The integer index that refers to the specific UPC traffic contract assigned to this VCI.
Protocol	Indicates what type of channel this is. Can be spans, pvc, fsig, spvc, or rcc. rcc is the routing control channel (0, 18) on PNNI links over which PNNI exchanges routing information. fsig stands for ATM Forum signalling.
Name	The unique, user-assigned name for this PVC. If no name is assigned, shows N/A.

To list all of the existing PVCs on a specific port, (for example, port 3B1), enter the following parameters:

myswitch::configuration vcc> show 3B1								
Input		Ou	tput					
Port	VPI	VCI	Port	VPI	VCI	UPC	Protocol	Name
3B1	0	5	3CTL	0	49	0	fsig	N/A
3B1	0	14	3CTL	0	48	0	spans	N/A
3B1	0	15	3CTL	0	47		spans	N/A
3B1	0	16	3CTL	0	50		fsig	N/A
3B1	0	100	3B4	0	100	0	pvc	N/A

The fields in this display are defined in the same manner as those in the previous example.

To list all of the existing PVCs on a specific port and path, (for example, port 3B1 and VPI 0), enter the following parameters:

myswit	ch::c	onfig	uratio	n vcc	> sho	w 3b1	0	
Input		Ou	tput					
Port	VPI	VCI	Port	VPI	VCI	UPC	Protocol	Name
3B1	0	5	3CTL	0	49	0	fsig	N/A
3B1	0	14	3CTL	0	48	0	spans	N/A
3B1	0	15	3CTL	0	47		spans	N/A
3B1	0	16	3CTL	0	50		fsig	N/A
3B1	0	100	3B4	0	100	0	pvc	N/A

The fields in this display are defined in the same manner as those in the previous example.

To list a specific PVC, enter the specific port, path, and channel (e.g., port 3B1, VPI 0, and VCI 100) as follows:

```
myswitch::configuration vcc> show 3B1 0 100

Input Output

Port VPI VCI Port VPI VCI UPC Protocol Name
3B1 0 100 3B4 0 100 0 pvc N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced information about all of the existing PVCs on a switch board, enter the following parameters:

myswit	myswitch::configuration vcc> show advanced								
Input		Out	tput						
Port	VPI	VCI	Port	VPI	VCI	Protocol	ConType		
3B1	0	5	3CTL	0	49	fsig	N/A		
3B1	0	14	3CTL	0	48	spans	N/A		
3B1	0	15	3CTL	0	47	spans	N/A		
3B1	0	16	3CTL	0	50	fsig	N/A		
3B1	0	100	3B4	0	100	pvc	tran-tran-pp		
3B2	0	5	3CTL	0	53	fsig	N/A		
3B2	0	14	3CTL	0	52	spans	N/A		
3B2	0	15	3CTL	0	51	spans	N/A		
3B2	0	16	3CTL	0	54	fsig	N/A		
Press	return	for	more,	q to	quit	: q			

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the virtual channel.
Input VPI	The incoming virtual path number.
Input VCI	The incoming virtual channel number.
Output Port	The outgoing port number of the virtual channel.
Output VPI	The outgoing virtual path number.
Output VCI	The outgoing virtual channel number.
Protocol	Indicates what type of channel this is. Can be spans, pvc, fsig, spvc, or rcc. rcc is the routing control channel (0, 18) on PNNI links over which PNNI exchanges routing information. fsig stands for ATM Forum signalling.
СопТуре	The connection type for the endpoints of this PVC with respect to a particular network. Orig (originating) means that the ingress/egress endpoint of the channel is connected to the source node which is outside the network, tran (transit) means that the ingress/egress endpoint of the PVC is connected to a node within the network, and term (terminating) means that the ingress/egress endpoint of the PVC is connected to the destination node which is outside the network. pp means this is labelled as a point-to-point PVC, pmp means this is labelled as a point-to-multipoint PVC, mpp means this is labelled as a multipoint-to-point PVC. mpmp means this is labelled as a multipoint-to-multipoint PVC.

VCC Configuration Commands

To list advanced information about all of the existing PVCs on a specific port, (e.g., port 3B1), enter the following parameters:

myswitch::configuration vcc> show 3b1 advanced								
Input		Ou	tput					
Port	VPI	VCI	Port	VPI	VCI	Protocol	ConType	
3B1	0	5	3CTL	0	49	fsig	N/A	
3B1	0	14	3CTL	0	48	spans	N/A	
3B1	0	15	3CTL	0	47	spans	N/A	
3B1	0	16	3CTL	0	50	fsig	N/A	
3B1	0	100	3B4	0	100	pvc	tran-tran-pp	

The fields in this display are defined in the same manner as those in the previous example.

To list advanced information about a specific PVC, enter the specific port, path, and channel (e.g., port 3B1, VPI 0, and VCI 100) as follows:

The fields in this display are defined in the same manner as those in the previous example.

CHAPTER 19 VPC Configuration Commands

These commands let you configure Permanent Virtual Paths (PVPs) which are also called Virtual Path Connections (VPCs). You can display the list of available subcommands by typing vpc ? at the configuration level.



In ForeThought 4.1 and greater, these commands are only used to configure through paths. To configure originating or terminating paths you must use the conf vpt commands.

```
myswitch::configuration> vpc ?
  delete
                                     show
```

19.1 Deleting a PVP

This command lets you delete an existing virtual (through) path. Enter the following:

```
myswitch::configuration vpc> delete <iport> <ivpi> <oport> <ovpi>
```

Creating a PVP 19.2

This command lets you add a virtual (through) path. There are advanced options which may be used in combination with the required parameters. Enter the following:

```
myswitch::configuration vpc> new <iport> <ivpi> <oport> <ovpi> [-upc <index>]
       [-name <name>]
advanced options:
       [-inctype (orig|tran|term) -outctype (orig|tran|term) [pmp|mppp|mpmp]]
       [-loopvpi <vpi>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
iport	The incoming port number.
ivpi	The incoming virtual path number. ¹
oport	The outgoing port number.
ovpi	The outgoing virtual path number.
-upc <index></index>	The integer index that refers to a specific UPC traffic contract. If no index is specified, then no traffic policing will take place on this VPI. It is assigned a UPC index of 0, and all traffic on this VPI is treated as UBR traffic. This is the default.
-name <name></name>	The name you want to assign to this through path to help identify it uniquely. It is most useful for billing purposes so you can identify which paths are being used by which customers. Can be up to 32 ASCII characters long.
-inctype (orig tran term)	The path connection type for the incoming path. For billing purposes, it denotes on which switch this path is arriving. Orig (originating) means that the ingress endpoint of the path is connected to the source node which is outside the network, tran (transit) means that the ingress endpoint of the path is connected to a node within the network, and term (terminating) means that the ingress endpoint of the path is connected to the destination node which is outside the network.
-outctype(orig tran term)	The path connection type for the outgoing path. For billing purposes, it denotes on which switch this path is leaving. Orig (originating) means that the egress endpoint of the path is connected to the source node which is outside the network, tran (transit) means that the egress endpoint of the path is connected to a node within the network, and term (terminating) means that the egress endpoint of the path is connected to the destination node which is outside the network.
pmp ²	Indicates this is a point-to-multipoint path.
mpp	Indicates this is a multipoint-to-point path.
mpmp	Indicates this is a multipoint-to-multipoint path.
-loopvpi <vpi></vpi>	This option is used to perform shaping. The originating vpi will be shaped by a through path going to a Series D network module. You should enter the receive vpi of the through path that goes from the looping port to the WAN port. This option is also used when creating the through path that connects from the WAN port to the looping port. The through path loopvpi should be the same vpi as the terminating path on the looping port. See Chapter 1 of the <i>ATM Switch Network Configuration Manual</i> for an example of this feature.

^{1.} The valid range of incoming and outgoing VPIs is 0 - 1022 (1023 is used for multicast). However, Series D E3 and DS3 network modules can only use VPIs 0 - 510 (511 is used for multicast).

^{2.} By indicating pmp, mpp, or mpmp, you are only assigning a label for record keeping purposes. The switch does not necessarily create the type of path you have specified. If you assign a connection type, but do not assign a pmp, mpp, or mpmp label, the switch assigns a label of pp (point-to-point).

The following is an example of how to create a virtual path which specifies a name:

```
myswitch::configuration vpc> new 3b1 75 3b5 75 -name customer_b
```

The following is an example of how to create a virtual path which specifies a name and a connection type:

```
myswitch::configuration vpc> new 3b6 62 3b2 62 -name customer_c -inctype tran
-outctype tran
```



Terminating and originating paths cannot be created across the inter-fabric ports on an *ASX*-1000, *ASX*-1200, or *TNX*-1100; only through paths can be created across the inter-fabric ports as shown in the following example.

The following is an example of how to create a simple virtual path on an *ASX*-1000, *ASX*-1200, or *TNX*-1100. To create a through path going in port 2A1, vpi 1 on the switch board installed in slot 2 and going out port 4B1, vpi 1 on the switch board installed in slot 4, enter the following:

```
myswitch::configuration vpc> new 2a1 1 2e4 1
myswitch::configuration vpc> new 2e4 1 2a1 1
myswitch::configuration vpc> new 4b1 1 4e2 1
myswitch::configuration vpc> new 4e2 1 4b1 1
```

In the first line in the first pair, notice that the output port is 2E4. This is the inter-fabric port. The 2 means the connection is coming out of the switch board in slot 2 through the inter-fabric port. The E represents the inter-fabric port. The 4 means the connection is destined for switch board in slot 4. 2E4 then becomes the input port in the second line.

In the first line in the second pair, notice that the output port is 4E2. This is the inter-fabric port. The 4 means the connection is coming out of the switch board in slot 4 through the interfabric port. The E represents the inter-fabric port. The 2 means the connection is destined for switch board in slot 2. 4E2 then becomes the input port in the second line.



Through paths cannot use VPI 0 on the interfabric port connections on an *ASX*-1000, *ASX*-1200, or *TNX*-1100.

19.3 Displaying PVPs

This command lets you display existing virtual (through) paths. You can show either all of the existing virtual paths on an individual switch fabric or all of the existing virtual paths on a specific port. Enter the following parameters:

myswitch::configuration vpc> show						
Input		Outpu	.t			
Port	VPI	Port	VPI	UPC	Prot	Name
3B1	40	3B4	40	0	pvc	customer_a
3B1	75	3B5	75	0	pvc	customer_b
3B2	95	3B3	95	0	pvc	customer_e
3B6	62	3B2	62	0	pvc	customer_c
3B6	68	3B3	68	0	pvc	customer_d

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the through path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the through path.
Output VPI	The outgoing virtual path number.
UPC	The integer index that refers to a specific traffic contract assigned to this through path. UPC contracts can be displayed using conf upc show.
Prot	The type of protocol running on this channel.
Name	The user-assigned name which helps to identify this through path uniquely.

To list advanced options about all of the existing virtual (through) paths, enter the following parameters:

iguration vpc> sh	ow advanced
tput	
rt VPI Shape C	onType
4 40 N	/A
5 75 N	/A
3 95 t	ran-tran-pmp
2 62 t	ran-tran-pp
3 68 N	/A

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the through path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the through path.
Output VPI	The outgoing virtual path number.
Shape	Indicates whether or not traffic shaping has been enabled for this path.
СопТуре	The connection type for the endpoints of this path with respect to a particular network. Orig (originating) means that the ingress/egress endpoint of the path is connected to the source node which is outside the network, tran (transit) means that the ingress/egress endpoint of the path is connected to a node within the network, and term (terminating) means that the ingress/egress endpoint of the path is connected to the destination node which is outside the network. pp means this is labelled as a point-to-point path, pmp means this is labelled as a multipoint-to-point path. mpmp means this is labelled as a multipoint-to-multipoint path.

If you have not configured any virtual (through) paths, then the following is displayed:

```
myswitch::configuration vpc> show
No virtual path information is available
```

VPC Configuration Commands

CHAPTER 20 VPT Configuration Commands

These commands let you configure virtual path terminators. You can display the list of available subcommands by typing vpt? at the configuration level.



These commands are only used to configure originating or terminating paths. To configure through paths, you must use the conf vpc commands.

myswitch::configuration> vpt ? delete modify

new

show

20.1 Deleting a Virtual Path Terminator

This command lets you delete a virtual path terminator. Enter the following parameters:

```
myswitch::configuration vpt> delete <port> <vpi> [(term | orig)]
```



Virtual Path 0 cannot be deleted on any of the connections to the inter-fabric ports on an *ASX*-1000, *ASX*-1200, or *TNX*-1100.

Virtual Path 0 cannot be deleted on any of the connections on a Circuit Emulation Services (CES) network module.

Virtual Path 0 cannot be deleted on the control port (CTL) on any switch.

The following is an example of how to delete a terminating path:

```
myswitch::configuration vpt> del 3b4 88 term
Would you like to delete the originating side also [y]? y
```

The following is an example of how to delete an originating path:

```
myswitch::configuration vpt> del 3b3 99 orig
Would you like to delete the terminating side also [y]? y
```

If you do not specify term or orig, the switch automatically deletes both sides of the path:

```
myswitch::configuration vpt> del 3b4 88
```



Before deleting a virtual path, you must first delete all VCCs which use that path.

These parameters are defined as follows:

Parameter	Description
port	The port number for this vpt.
vpi	The path number for this vpt.
term	Specifies that the vpt to be created is a terminating path.
orig	Specifies that the vpt to be created is an originating path.

20.2 Modifying a Virtual Path Terminator

This command lets you modify an existing virtual path terminator. Enter the following:

```
myswitch::configuration vpt> modify <port> <vpi> [(term|orig)] -reserved <Kbps>
        [-maxvci <vci>]
        [-cbr (none | default | <QoSExtIndex>)]
        [-rtvbr (none | default | <QoSExtIndex>)]
        [-nrtvbr (none | default | <QoSExtIndex>)]
        [-ubr (none | default | <QoSExtIndex>)]
        [-abr (none | default | <QoSExtIndex>)]
```

These parameters are defined as follows:

Parameter	Description
port	The port number for this vpt.
vpi	The path number for this vpt.
term	Specifies that the vpt to be created is a terminating path.
orig	Specifies that the vpt to be created is an originating path.
reserved	The amount of bandwidth, in Kbps, that you want to reserve on this vpt. If this option is not used, an elastic path is created. Elastic paths allocate and de-allocate bandwidth for their channels from the link.
maxvci	The maximum VCI number to be supported on the control port. The allowable range is from 1 - 8191 on the <i>ASX</i> -4000 and the <i>ESX</i> -3000. The allowable range is 1 - 4095 on all other switch platforms. The default is 4095 on the <i>ASX</i> -4000 and the <i>ESX</i> -3000. The default is 1023 on all other switch platforms.
none	The specified class of service (CBR, real-time VBR, non real-time VBR, UBR, or ABR) is not supported.
default	The default parameters of 0 CTD, 0 CDV, and 0 CLR are to be used for the CBR service class.
QoSExtIndex	The index number of the set of QoS extension parameters. See the QoSExtIndex field under conf qosext show for this number. The QoSExtIndex must exist before it can be applied to a vpt.

In the modify command, the -maxvci parameter can only be used to configure the maximum number of VCIs on the control port. Modifying this value affects both originating and terminating paths, regardless of what you enter. If you specify term or orig, you get the following message:

```
myswitch::configuration vpt> modify \ 4ctl \ 0 \ term \ -maxvci \ 2000 Modifying the VCs for the Control Port will affect both the terminating and the originating paths

Continue with modify? [n] y
```

If you do not want to continue, simply press **<enter>** or type n and press **<enter>**. No change will occur. If you want to continue, type y and press **<enter>**. You are prompted to reboot the switch for the change to take effect as follows:

```
Modifying the VCs for the Control Port needs a switch reboot Continue with modify and reboot the switch? [n] \mathbf{y}
```

If you do want the change to take effect, simply press **<ENTER>** or type **n** and press **<ENTER>**. You receive the following message to confirm that no change occurred:

```
Current values unaffected
```

If you want the change to take effect, type y and press <ENTER>. The switch checks to see if there are sufficient contiguous connection-table entries available on the fabric to accommodate the newly configured control port VCI value. If the requested value can be accommodated, the switch is rebooted and the change takes effect. If there are not enough entries, an error message is printed, and no reboot or change occurs. If the request fails, you can try reducing the number of connections on other ports and attempt this command again.

20.3 Creating a Virtual Path Terminator

This command lets you create a new virtual path terminator. Enter the following parameters:

The following is an example of how to create a terminating path:

```
myswitch::configuration vpt> new 3b3 99 term Would you like to create the originating side also [y]? y
```

The following is an example of how to create a originating path:

```
myswitch::configuration vpt> new 3b4 88 orig
Would you like to create the terminating side also [y]? y
```

If you do not specify term or orig, the switch automatically creates both sides of the path:

```
myswitch::configuration vpt> new 3b4 88
```

These parameters are defined as follows:

Parameter	Description
port	The port number for this vpt.
vpi	The path number for this vpt.
term	Specifies that the vpt to be created is a terminating path.
orig	Specifies that the vpt to be created is an originating path.
reserved	The amount of bandwidth, in Kbps, that you want to reserve on this vpt. If this option is not used, an elastic path is created. Elastic paths allocate and de-allocate bandwidth for their channels from the link.

Parameter	Description
minvci	The bottom number for the range of VCIs to be reserved for VCCs on this vpt. The default is 1.
maxvci ¹	The top number for the range of VCIs to be reserved for VCCs on this vpt. The default is 511.
shapeovpi ²	The output port of a traffic shaping originating vpt. Setting this value configures traffic shaping on the originating path. Cells bound for the network leave the traffic shaping port with this VPI. When the traffic shaping port is the WAN port, this value equals the input VPI of the originating path. If the traffic shaping port is not the WAN port, this value equals the input VPI of the through path from the shaping port to the WAN port. This parameter only applies to the Series C network modules.
loopvpi	The originating vpi will be shaped by a through path going to a Series D network module. You should enter the input vpi of the through path that goes from the looping port to the WAN port. This option is also used when creating the through path that connects from the WAN port to the looping port. The through path loopvpi should be the same vpi as the terminating path on the looping port. See Chapter 1 of the <i>ATM Switch Network Configuration Manual</i> for an example of this feature.
vbrob	The bandwidth overbooking level for this vpt, specified as a percentage. Valid values are integers from 1 to 32,767. 100 means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 cause overbooking. Overbooking cannot be specified on an elastic path. Therefore, you can only specify an overbooking factor for an originating path when you also have reserved bandwidth for the path (i.e., specified the -reserved <kbs> parameter).</kbs>
vbrbuffob	The buffer overbooking level for this vpt, specified as a percentage. Valid values are integers greater than or equal to 1. 100 means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 cause overbooking. Overbooking cannot be specified on an elastic path. Therefore, you can only specify an overbooking factor for an originating path when you also have reserved bandwidth for the path (i.e., specified the -reserved <kbs> parameter).</kbs>
none	The specified class of service (CBR, real-time VBR, non real-time VBR, UBR, or ABR) is not supported.
default	The default parameters of 0 CTD, 0 CDV, and 0 CLR are to be used for the CBR class of service.
QoSExtIndex	The index number of the set of QoS extension parameters. See the QoSExtIndex field under conf qosext show for this number. The QoSExtIndex must exist before it can be applied to a vpt.

^{1.} In the new command, the -maxvci parameter can be used for any VPT. In the modify command, it is only used on the control port.

^{2.} If you want to shape traffic on more than two ports on a given network module, it is recommended that you set the traffic memory model to model number 5 for Series C network modules, using conf module traffic c setmodel.

20.4 Displaying Virtual Path Terminators

This command lets you display virtual path terminators for all of the ports on a switch board. Enter the following parameters:

Input		Outpu	t						
Port	VPI	Port	VPI	ResBW	CurBW	MinVCI	MaxVCI	VCs	Protocol
1C1	0	termi	nate	N/A	0.8K	1	511	6	pvc
1C2	0	termi	nate	N/A	0.8K	1	511	7	pvc
1C3	0	termi	nate	N/A	0.8K	1	511	6	pvc
1C4	0	termi	nate	N/A	0.8K	1	511	5	pvc
1CTL	0	termi	nate	N/A	0.0K	1	1023	19	pvc
origi	nate	1C1	0	N/A	0.8K	1	511	6	pvc
origi	nate	1C2	0	N/A	0.8K	1	511	7	pvc
origi	nate	1C3	0	N/A	0.8K	1	511	6	pvc
origi	nate	1C4	0	N/A	0.8K	1	511	5	pvc
origi	nate	1CTL	0	N/A	0.0K	1	1023	22	pvc

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the vpt. Shows originate if it is an originating path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the vpt. Shows the number of the output port of the vpt. Shows terminate if it is a terminating path.
Output VPI	The outgoing virtual path number.
ResBW	The maximum amount of bandwidth, in Kbps, that is reserved for the virtual channels using this vpt. A value of N/A indicates that this path is an elastic path. Elastic paths allocate and de-allocate bandwidth for their channels from the link.
CurBW	The amount of bandwidth, in Kbps, that is being used by the virtual channels using this vpt.
MinVCI	The bottom number for the range of VCIs that are reserved for VCCs on this virtual path terminator.
MaxVCI	The top number for the range of VCIs that are reserved for VCCs on this virtual path terminator. Also, this is the maximum VCI number to be supported on the control port.
VCs	The number of virtual channels that are currently using this vpt.
Protocol	The type of protocol running on this channel.

20.4.1 Displaying Advanced VPT Information

You can also display advanced or QoS extension parameter information about VPTs.

```
myswitch::configuration vpt> show [<port> [<vpi>]] [advanced] [qosext]
```

To list all of the advanced options about all of the existing virtual path terminators, enter the following parameters:

```
myswitch::configuration vpt> show advanced

Input Output

Port VPI Port VPI ShapeVPI LoopVPI VBROB BuffOB

1B1 0 terminate N/A N/A N/A N/A

1B1 1 terminate N/A N/A N/A N/A

originate 1B1 0 port port

originate 1B1 1 1 1 0 port port
```

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the vpt. Shows originate if it is an originating path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the vpt. Shows terminate if it is a terminating path.
Output VPI	The outgoing virtual path number.
ShapeVPI	Shows the output port on which traffic shaping has been enabled for this originating vpt. This only applies to Series C network modules. N/A means that shaping has not been configured on this port.
LoopVPI	Shows the looping port that has been configured to loop traffic on that port for shaping on a Series D port. N/A means that looping has not been configured on this port.
VBROB	The bandwidth overbooking level assigned to this vpt, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. port means this is an elastic path. Since elastic paths derive their overbooking factors from their parent ports, use conf port show to display the overbooking value.
BuffOB	The buffer overbooking level assigned to this vpt, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. port means this is an elastic path. Since elastic paths derive their overbooking factors from their parent ports, use conf port show to display the overbooking value.

20.4.2 Displaying QoS Extension Information for VPTs

To display QoS extension parameter information about VPTs, enter the following parameters:

myswit	ch::c	onfigur	ration	vpt> sho	w qosext		
Type	Port	VPI	Cbr	RtVbr	NrtVbr	Abr	Ubr
term	1C1	0	1	1	1	9	9
term	1C3	0	5	5	5	9	9
term	1C4	0	3	3	3	9	9
orig	1C1	0	1	1	1	1	1
orig	1C3	0	4	4	4	4	4
orig	1C4	0	2	2	2	2	2

The fields in the qosext display are defined as follows:

Field	Description
Туре	Shows if this is an originating or a terminating path.
Port	The port number.
VPI	The virtual path number.
Cbr	Shows the path QoS metric information for CBR service.
RtVbr	Shows the path QoS metric information for RtVBR service.
NrtVbr	Shows the path QoS metric information for NrtVBR service.
Abr	Shows the path QoS metric information for ABR service.
Ubr	Shows the path QoS metric information for UBR service.

VPT Configuration Commands

Index

A	setting for SPVPs 12 - 60
AIS (Alarm Indication Signal)2 - 4	back-off mechanism
Alarm Indication Signal (AIS)2 - 4	enabling/disabling for
alternate CLP threshold	PNNI SPVCs 12 - 9
configuring on a Series D network module 2 - 90	enabling/disabling for PNNI SPVPs12 - 55, 12 - 58
AMI	bandwidth overbooking on a port
displaying the inactivity timeout	configuring
setting the inactivity	batch command
timeout	PVCs
AMI session timeout	SPVPs
displaying	batch PNNI SPVCs
ATM port cards	BNP notation
displaying information for an ESX-3000 3 - 1	displaying for a port identifier12 - 50, 12 - 66
audit logging	buffer overbooking on a port
AMI14 - 18	configuring 2 - 98
disabling	displaying 2 - 62
displaying the state 14 - 17	C
enabling	-
ILMI	call records
SNMP14 - 20	changing the data server password 13 - 11
authentication method	configuring
for logins 8 - 16	
В	configuring new transfer variables
back	deleting transfer
back-off interval	variables
	disabling
displaying for PNNI SPVCs 12 - 42	displaying information 13 - 13
displaying for SPVPs 12 - 60	enabling
setting for PNNI SPVCs 12 - 41	enabinig13 - 11

modifying transfer	
variables 13 - 8	D
post-processing 13 - 14, 13 - 22	-
carrier detection	default calling party number
displaying for a port 2 - 62, 2 - 73	enabling/disabling 9 - 8
CDV	default estimated bandwidth value
configuring on a Series C	assigning for UBR SPVCs 12 - 48
network module 2 - 77	displaying for UBR SPVCs 12 - 48
CDVT	Designated Transit
configured on a	Lists (DTLs)
per-port basis 2 - 6	disabling CES on a DS1 CES port 2 - 7
displaying for a port 2 - 62	disabling CES on an E1 CES port 2 - 13
Cell Delay Variation	distributed timing
Tolerance (CDVT) 2 - 6	configuring on a switch 15 - 3
clock scaling factor	displaying on a switch 15 - 2
displaying 13 - 45	DS1 CES network modules
setting 13 - 23	disabling AIS upstream 2 - 9
CLP threshold	displaying information 2 - 12
configuring on a Series D	enabling AIS upstream 2 - 9
network module 2 - 91	framing 2 - 7
setting on a Series 1	line coding 2 - 11
port card 2 - 87	line length 2 - 8
setting on a Series C	line status 2 - 10
network module 2 - 77	loopback 2 - 11
setting on a Series LC	DS1 network modules
network module 2 - 80	displaying
setting on a Series LE	configuration of 2 - 24
network module 2 - 83	empty cells 2 - 20
setting on an ESX-3000	line length 2 - 21
ATM port card 2 - 83	loopback 2 - 22
computing the destination	mode of operation 2 - 22
NSAP	PRBS 2 - 23
configuration commands in AMI 1 - 1	scrambling 2 - 23
	timing
connection preservation	DS3 network modules
displaying the status	displaying
Status 13 - 43	configuration of 2 - 29
	empty cells 2 - 26
	επρι τοπο ω ω

framing 2 - 27	E1 network modules
line length 2 - 27	displaying
loopback 2 - 28	configuration of 2 - 34
mode of operation 2 - 28	empty cells 2 - 31
scrambling 2 - 29	line length 2 - 32
timing 2 - 30	loopback 2 - 33
DTLs (Designated Transit Lists)	mode of operation 2 - 33
12 - 13, 12 - 30	scrambling 2 - 34
dual SCPs	timing 2 - 35
configuring autoremove 14 - 3	E3 network modules
configuring autosync 14 - 4	displaying
configuring failover 14 - 5	configuration of 2 - 38
configuring switchover 14 - 8	empty cells 2 - 36
configuring the	loopback 2 - 37
controlling SCP 14 - 5	mode of operation 2 - 37
displaying settings 14 - 7	scrambling 2 - 38
file synchronization 14 - 9	timing 2 - 39
resetting the standby SCP 14 - 6	EFCI
setting the failover	configuring on Series C
threshold 14 - 10	network modules 2 - 78
E	enabling CES on a DS1 CES port 2 - 7
E.164 address	enabling CES on an E1 CES port 2 - 13
mapping from NSAP	End System Identifier (ESI) 13 - 26
address 9 - 7	EPD/PPD profile
plan type	creating 4 - 2
E.164 address format	deleting 4 - 2
configuring	displaying 4 - 4
E1 CES network modules	ESX-3000 ATM port card
CRC4 framing 2 - 14	configuring the port
disabling AIS upstream 2 - 15	queue size 2 - 84
displaying information 2 - 18	displaying port and priority
enabling AIS upstream 2 - 15	traffic information 2 - 84
line status	setting the CLP threshold 2 - 83
loopback	exporting a clock source for
TS16 2 - 14	distributed timing 15 - 3

F	deleting 4 - 12
fabric ID	displaying 4 - 14
configuring	G GCRA traffic policing
displaying	per-port basis 2 - 60
Frame Relay rate profile	Generic Cell Rate
creating	Algorithm (GCRA) 2 - 40
deleting	н
displaying	hardware version
Frame-based UNI (FUNI)	displaying
FramePlus DS1 network modules	displaying
configuring the state 2 - 44	I
displaying information 2 - 48	ILMI
framing	changing the default
line coding	signalling channel 9 - 5
line interface	enabling/disabling on a signalling channel 9 - 4
line length	ILMI address registration
line status	enabling/disabling 9 - 6
loopback	information element (IE) filters
timing 2 - 49 FramePlus E1 network modules	enabling/disabling 9 - 7
	interface type
configuring the state 2 - 49	configuring for a
CRC4 framing	signalling channel 9 - 4
displaying information 2 - 52 line interface 2 - 49	IP access
line status	creating an
	authorized address 8 - 2
loopback 2 - 52	IP filtering
timing	all flag 8 - 3
	deleting an authorized
FRF.8 profile	address 8 - 2
creating	displaying authorized
deleting 4 - 5	addresses 8 - 4
displaying	displaying IP
FUNI (Frame-based UNI) 4 - 12	filtering flags 8 - 4
	lsr flag 8 - 3
FUNI profile	ssr flag 8 - 3
creating 4 - 13	

J	configuring for PP calls 13 - 42
J2 network modules	displaying
displaying 2 - 56 configuration of 2 - 56 empty cells 2 - 54 line length 2 - 55 loopback 2 - 55 timing 2 - 57 L Link Management	N node secret file 8 - 19 NSAP filtering 8 - 22 adding a template to a filter 8 - 23 adding an NSAP filter to an interface 8 - 27 creating a filter 8 - 25
Interface (LMI) 4 - 15	creating a template 8 - 29
LMI (Link Management Interface) 4 - 15 LMI profile creating 4 - 15 deleting 4 - 15	deleting a filter
displaying 4 - 17	deleting a template from a filter
log deleting the host address	displaying interface filters 8 - 28 displaying the filters 8 - 26 displaying the templates 8 - 31 modifying a template 8 - 30 testing against a filter 8 - 24
enabling output to the console	OAM cell generation disabling on a port
M	enabling on a port 2 - 4
MAC address (ESI) configuring	originating paths adding
maximum VPI value configuring	deleting
configuring	information
configuring for PMP calls13 - 42	overbooking2 - 62, 2 - 98, 2 - 99

P	back-off mechanism 12 - 41
performance monitoring	batch command 12 - 6, 12 - 23
configuring	disabling rerouting 12 - 9
configuring new	displaying 12 - 15, 12 - 34
transfer variables 13 - 15	displaying advanced
deleting transfer	information 12 - 18, 12 - 38
variables 13 - 20	displaying back-off
disabling	interval
displaying information 13 - 21	displaying general
enabling 13 - 19	information 12 - 16, 12 - 36
modifying transfer	displaying pacing
variables 13 - 16	information 12 - 44
performance records	displaying rerouting
changing the data server	information 12 - 47
password 13 - 19	displaying summary
PMP PNNI SPVC	information 12 - 20, 12 - 40
creating	enabling rerouting
deleting	enabling/disabling back-off
modifying	mechanism 12 - 9
PMPs	pacing 12 - 42
displaying the maximum number	rerouting
of reserved VCIs 13 - 45	setting back-off interval 12 - 41
displaying the minimum number	setting the improvement threshold
of reserved VCIs 13 - 45	for rerouting 12 - 47
setting the maximum number	setting the interval
of reserved VCIs 13 - 39	for rerouting
setting the minimum number	setting the number to check for rerouting 12 - 47
for reserved VCIs 13 - 40	setting the number
PNNI link	to pace
configuring	setting the pacing
PNNI SPVC	interval
computing the destination	PNNI SPVPs
NSAP12 - 12, 12 - 29	disabling rerouting
creating	enabling rerouting 12 - 55
deleting	enabling/disabling back-off
example12 - 11, 12 - 28	mechanism12 - 55, 12 - 58
obtaining a destination	point-to-multipoint
NSAP 12 - 5	connections (PMPs)
PNNI SPVCs	

point-to-multipoint	setting on an ESX-3000
SVCs (PMPs)	ATM port card 2 - 84
policing	port state
displaying for a port 2 - 62	configuring 2 - 3
pools	prompt name
configuring	changing 14 - 11
configuring for	displaying
PMP calls 13 - 42	PVC
configuring for PP calls 13 - 42	adding 18 - 3
displaying	deleting
oort and priority traffic information	PVC/PVP
displaying on a Series 1	connection preservation 13 - 24
port card 2 - 88	PVCs
displaying on a Series C	displaying 18 - 5
network module 2 - 79	0
displaying on a Series D	Q
network module 2 - 94	QOS expansion table
displaying on a Series LC	creating an entry 5 - 3
network module 2 - 81	deleting an entry 5 - 2
displaying on a Series LE	displaying
network module 2 - 84	QOS extension table
displaying on an <i>ESX</i> -3000 ATM port card2 - 84	creating an entry 6 - 2
	deleting an entry 6 - 1
displaying on an LE 155 2 - 86	displaying 6 - 3
oort cards	modifying an entry 6 - 1
ATM 2 - 83	R
port configuration	rate enforcement
displaying 2 - 62	configuring ingress 4 - 9
port queue size	rate limit
configuring on a Series 1	configuring on a Series D
port card 2 - 88	network module 2 - 92
configuring on a Series C	RDI (Remote Defect Indication) 2 - 4
network module 2 - 78	related manualsii
configuring on a Series D network module2 - 91	Remote Defect Indication (RDI) 2 - 4
	reserved VCIs for PMP connections
configuring on a Series LC network module2 - 81	
configuring on a Series LE	setting the maximum
network module 2 - 84	setting the minimum 13 - 40
8 8	setting the minimum 13 - 40

reserved VCIs for PMP SVCs	displaying port and priority
displaying the	traffic information 2 - 88
maximum 13 - 45	setting the CLP threshold 2 - 87
displaying the	Series C network modules
minimum 13 - 45	configuring CDV 2 - 77
S	configuring EFCI 2 - 78
scheduling	configuring port
guaranteed 2 - 93	queue size 2 - 78
round-robin 2 - 93	displaying port and priority
smoothed	traffic information 2 - 79
scheduling information	setting the CLP threshold 2 - 77
displaying on a Series D	Series D network module
network module 2 - 96	configuring the CLP
scheduling traffic on a Series D	threshold 2 - 91
network module 2 - 93	Series D network modules
sdconf.rec file	configuring alternate
retrieving 8 - 18	CLP thresholds 2 - 90
SecurID	configuring the port
configuring 8 - 18	queue size
deleting the	configuring the rate limit 2 - 92
configuration file 8 - 19	displaying port and priority traffic information 2 - 94
deleting the node	scheduling traffic 2 - 93
secret file 8 - 19	Series LC network modules
deleting the sdconf.rec	configuring the port
file 8 - 19	queue size 2 - 81
displaying the	displaying port and priority
configuration file 8 - 19	traffic information 2 - 81
displaying the sdconf.rec file 8 - 19	setting the CLP threshold 2 - 80
SecurID file	Series LE network modules
retrieving 8 - 18	configuring the port
serial port	queue size 2 - 84
displaying	displaying port and priority traffic
configuration of	information 2 - 84, 2 - 86
Series 1 port cards	setting the CLP threshold 2 - 83
configuring the port	service profile
queue size 2 - 88	creating 4 - 19
queue 5226 2 00	deleting 4 - 18
	displaying 4 - 20

signalling channel	SNMP trap destination
adding 9 - 3	adding
applying NSAP filters 9 - 8	deleting
carrier loss 9 - 6	displaying
changing the default VCI 9 - 4	SNMP trap log
configuring the mode 9 - 6	displaying
configuring the scope 9 - 5	displaying the threshold 10 - 8
deleting 9 - 1	modifying the threshold 10 - 7
displaying 9 - 9	resetting the threshold 10 - 7
displaying ATM	software version
information 9 - 11	displaying
displaying ATM range	SONET network modules
information 9 - 12	displaying
displaying ATM routing	configuration of 2 - 69
information 9 - 15	displaying status of 2 - 70
displaying IE filter	empty cells 2 - 66
information 9 - 19	loopback 2 - 67
displaying NSAP filter information 9 - 20	mode of operation 2 - 68
	scrambling 2 - 68
displaying protocol information 9 - 13	timing 2 - 71
displaying public	SPANS address
information 9 - 17	displaying
displaying timer	SPANS signalling path
information 9 - 16	adding
modifying 9 - 2	deleting 11 - 2
QOS expansion 9 - 6	displaying advanced information
SSCOP no response timer 9 - 6	for a port and path 11 - 7
Smart Permanent	displaying advanced information
Virtual Circuit	for all
Smart Permanent Virtual Path 12 - 51	displaying all11 - 5
SNMP community	displaying for a port 11 - 7
changing 10 - 1	displaying for a port
SNMP SETs	and path 11 - 7
disabling	SPANS SPVC
displaying if they are	creating
enabled or not 10 - 2	deleting 12 - 2
enabling	SPANS SPVCs
	displaying

SPVC(Smart Permanent Virtual Circuit)	setting the improvement threshold
	for rerouting 12 - 65
SPVC traps	setting the interval
configuring 12 - 48	for rerouting 12 - 64
SPVCs	setting the number to check
configuring default estimated	for rerouting 12 - 64
UBR bandwidth 12 - 48	setting the number
displaying default estimated	to pace 12 - 61
UBR bandwidth 12 - 48	setting the pacing
SPANS 12 - 1	interval 12 - 61
SPVP 12 - 51	SVP 12 - 51
creating	switch name
deleting	changing 13 - 29
displaying rerouting	displaying
information 12 - 64	setting 13 - 29
modifying 12 - 58	switch type
obtaining a destination	displaying
NSAP 12 - 53	switch uptime
SPVP traps	displaying
configuring	switchclock
SPVPC (Smart Permanent Virtual	configuring
Path Connection) 12 - 51	displaying
SPVPs	Switched Virtual Path (SVP) 12 - 51
batch command 12 - 51	
configuring backoff 12 - 60	T
configuring rerouting 12 - 63	TAXI network modules
displaying 12 - 68	displaying configuration of \dots 2 - 73
displaying advanced	loopback 2 - 72
information 12 - 70	Technical Assistance Center (TAC)
displaying back-off	contacting iii
interval 12 - 60	terminating paths
displaying basic	adding 20 - 2, 20 - 3, 20 - 5
information 12 - 68	deleting
displaying pacing	displaying 20 - 7
information 12 - 62	displaying advanced
displaying summary	information 20 - 8
information 12 - 72	through path
pacing 12 - 61	adding
setting back-off interval 12 - 60	deleting

through paths	UNI protocol
displaying 19 - 4	configuring on a
displaying advanced	signalling channel 9 - 4
information 19 - 5	units
time zone	displaying for UPC
displaying 13 - 45	contracts 14 - 1
setting	unlisted users
timeout	changing privilege level 8 - 21
displaying for an	displaying privilege level 8 - 21
AMI session 14 - 1	UPC contract
timing	adding 17 - 1
configuring on a switch 15 - 3	configuring on the input
displaying on a switch 15 - 2	signalling channel 9 - 5
TP25 network modules	configuring on the output
displaying	signalling channel 9 - 5
configuration of 2 - 75	deleting 17 - 1
loopback 2 - 74	displaying 17 - 6
traffic contracts	displaying traffic
traffic descriptor table 16 - 1	management flags 17 - 7
adding an entry16 - 2	UPC contracts
deleting an entry 16 - 1	displaying the type of
displaying 16 - 3	units used
traffic policing	userid
displaying for a port 2 - 62	changing a password 8 - 17
transfer protocol	changing login access 8 - 15
configuring on an SCP 14 - 12	changing privileges 8 - 15
traps	changing the authentication
configuring for SPVCs 12 - 48	method 8 - 15
configuring for SPVPs 12 - 65	creating
	deleting 8 - 14
U	displaying all
UNI 3.0 link	enabling/disabling the finger
configuring 9 - 4	mechanism 8 - 15
UNI 3.1 link	modifying
configuring	setting a password 8 - 17
UNI 4.0 link	setting login access 8 - 16
configuring 9 - 4	setting privileges

Index

setting the authentication
method 8 - 16
whoami command 8 - 21
userid login file
backing up 8 - 13
restoring 8 - 17
V
VCI allocation range
configuring 9 - 5
virtual channels
displaying maximum
number 13 - 44
virtual path
adding
deleting
displaying
displaying advanced
information 19 - 5
virtual path terminator
creating
deleting 20 - 2
displaying 20 - 7
displaying advanced
information 20 - 8
modifying 20 - 3
virtual paths
displaying maximum
number
w
whoami 8 - 21